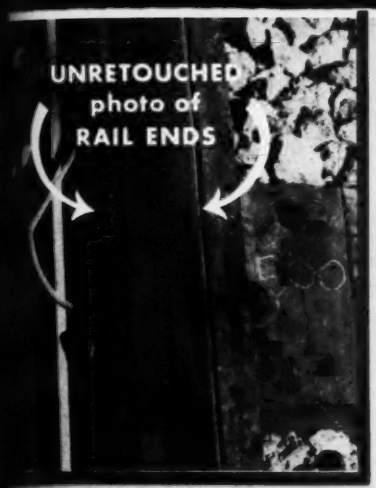


TIGHT RAIL on the

L&N

THE RAIL JOINT COMPANY Inc.

50 CHURCH ST. NEW YORK 7, N. Y.

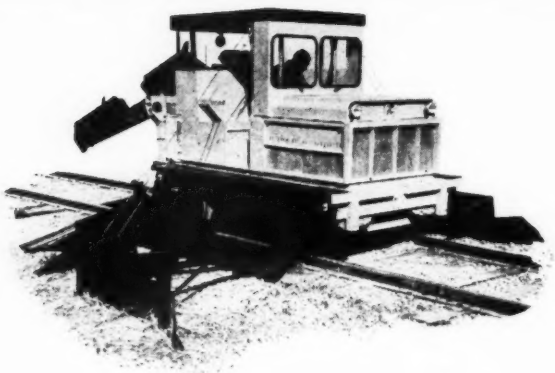
weed control...

at

NO EXTRA COST OR EFFORT

with

The KERSHAW
BALLAST REGULATOR SCARIFIER and PLOW
"TRACK PATROL"



Recognize This Symbol of Leadership

KERSHAW
MANUFACTURING CO. INC.
MONTGOMERY ALABAMA

How to keep a crossing in its place

See those trim little plates paired off on the ties, with their built-in "hooks" hugging tight to the rail? Those are Bethlehem Hook Twin Tie Plates, and they are stubbornly bent on keeping this crossing right where it belongs.

And they can do that job superbly, just as they excel in holding down frogs, closure rails, tee guard rails, graduated riser switches, or tongue switches and mates. For one thing, those sturdy forged hooks are larger and stronger than ordinary spike heads. For another, they distribute the load over a greater tie area, reducing the pull on any one spike. Thus the track is better anchored, vertical and lateral thrusts are checked, and ties are given a considerably longer lease on life.

Your stores department will like the way Hook Twin Tie Plates hold down inventories, too. Normally three or four lengths of these plates are all you'll ever need to carry in stock, since any two plates will fit most any position on any frog or crossing on your lines.

Hook Twin Tie Plates can normally be furnished from stock in 23-, 27-, 31- and 35 in. lengths, 4-in. width, and in thicknesses of ¾, ⅞ and 1 in. Hooks may be specified "low" for contacting rail bases, "high" for cast-manganese sections. Reverse-hook plates, used at heel-ends, are available in all lengths. For further details just call the nearest Bethlehem sales office or write direct to us at Bethlehem, Pa.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

BETHLEHEM STEEL

BETHLEHEM STEEL

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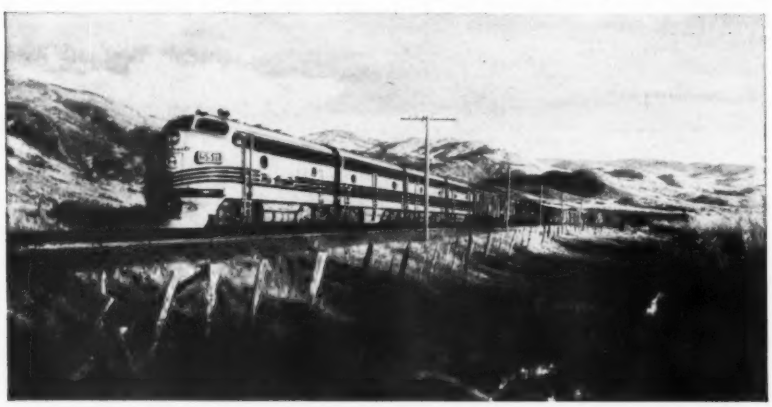
MAIN LINE Rio Grande THRU THE ROCKIES

Promotes Track Safety with SPERRY RAIL SERVICE

Safety of operation has always been one of the prime considerations of The Denver & Rio Grande Western Railroad. Through a continuing modernization program, including the replacement of obsolete equipment and worn track, the road has been able to achieve high standards of safety. One of the greatest contributions toward this effort has been the Sperry Rail Service . . . used to test rail since 1936.

About 22 track miles of 115- and 119-pound rail were laid in 1955, part of the continuing Rio Grande track maintenance program. Track is tested every three to six months, depending on density and class of traffic, age and condition of rail. With this frequency of testing, the size of defects is kept to a minimum.



Eighteen diesel-electric motive units were added last year as part of the railroad's continuous modernization program. The freight car fleet was sizably increased by the construction of 100 new double-deck stock cars. To compensate for heavier traffic conditions and to avoid delays, rail-testing schedules are carefully planned to coordinate Rio Grande forces with SRS crews.

Improvements planned for 1956 will include practically complete dieselization of standard gauge operations . . . also the addition of 100 new box cars, 100 new flat cars and 25 70-ton all-steel covered hoppers. In the maintenance-of-way department, part of the new rail program will be the laying of 45 miles of rail in replacement sections.

Continuous research and development enable Sperry Rail Service to meet the strict rail-testing requirements of modern railroads. This exclusive advantage provides positive assurance that Sperry inspection methods and equipment are the most advanced. For information on testing rail in track, diesel axles, wheels or other vital components, write or phone for latest procedures.

Sperry

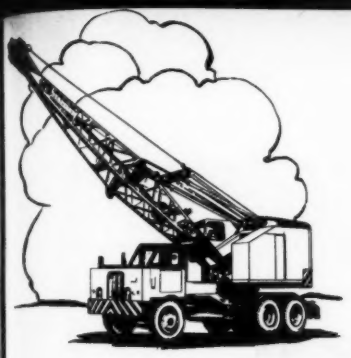
FIRST IN RAIL TESTING

SPERRY RAIL SERVICE

Division of Sperry Products, Inc.

Danbury, Conn.

New York Chicago St. Louis



Loads quickly on trailer or car or you can have it truck-mounted. In either case it's easy to get off to the job.

What a NORTHWEST would mean on YOUR DIVISION!

Works from the car along the line.

Trims banks, digs ditches, drives piles, handles magnet, tongs, clam, grapple and any other equipment that can be hung on a cable.

A *real* Rock Shovel in any size. Here a Northwest is loading out rip rap for the Northern Pacific.

NORTHWESTS are easy to load — they load under their own power on either a flatcar or a trailer. You put them on the job easily, either on or off the line.

Northwest traction negotiates rough going and crosses rails without difficulty and on the larger Northwests you have positive traction on both crawlers while turning as well as when going straight ahead. Northwests get you there and more — they bring you back.

Northwest control is mechanical. The "Feather-Touch" Clutch Control utilizes the power of the engine to throw the heavy drum clutches, reducing that day-end fatigue. The device is simple, free from delicate, complicated pumps and compressors that sometimes require special knowledge for adjustment, and it can be shifted to full manual control at any time. Your Northwest can't be shut down by control failure nor slowed down by poor response in controls.

Northwests work from the car or the ground and they can be quickly converted from a Crane to Dragline, standard Shovel or Pullshovel for any type of material handling or excavation problem confronting you. Your Northwest means lower cost maintenance. Ask for details on the size you need.

NORTHWEST ENGINEERING COMPANY
1513 Field Bldg., 135 South LaSalle Street, Chicago 3, Illinois

NORTHWEST

THE ALL PURPOSE RAILROAD MACHINE
CRAWLER OR RUBBER MOUNTED SHOVELS
CRANES • DRAGLINES • PULLSHOVELS

G-5-OG

Now You Can Spot Tamp ...Quickly and Easily

... the extra power of Le Roi Tractair lets you do faster, better work

SUPERIOR track — that is, a better road bed — calls for good spot tamping. Le Roi with its redesigned Tractair unit, giving you 125 cfm instead of 105 cfm, makes it easy to tamp this superior way.

You see, Tractair's extra capacity gives a greater margin of reserve air than ever before, in operating four, Cleveland C10T, heavy-duty tie tampers. And Cleveland C10T heavy-blow tampers are easy to handle — have a fast, hard-hitting blow that lets your men do a thorough job of tamping in a much shorter time.

You not only save time and money, but you also get a smoother track — one that will stand up longer under the heavy, fast trains of today.

And you can use your Le Roi Tractair, a combination 42-hp wheel tractor and 125-cfm compressor, for many other jobs such as: Handling off-season work for B&B, Signal, T&T, and Water Service Departments. Stockpiling ballast, cinders, and other materials. Driving spikes, breaking pavement. Driving moil points for grouting. Ditching, light grading, and mowing.

The new Tractair can help you reduce the cost of your M. of W. jobs. Write to our Railroad Sales Department, 327 South LaSalle Street, Chicago 4, Illinois, or to us for latest literature.

T-38

LE ROI *Division of Westinghouse Air Brake Co.*

Milwaukee 1, Wisconsin

Manufacturers of Cleveland Air Tools

PORTABLE AIR COMPRESSORS

TRACTAIR

STATIONARY AIR COMPRESSORS

AIR TOOLS

ENGINES

Look

NO WEEDS!

UREABOR*

WEED and GRASS KILLER

kills weeds—

prevents regrowth!

LOW RATE OF APPLICATION—

EFFECTIVELY DESTROYS WEEDS AND GRASSES

NOTHING TO MIX—NO WATER TO HAUL

NONCORROSIVE • NONFLAMMABLE

*UREABOR is a trade-mark of Borax Consolidated, Limited

MANUFACTURERS OF FAMOUS "20 MULE TEAM" PACKAGE PRODUCTS

One application—DRY—may keep soil bare for 1 or 2 years!

Here's new UREABOR . . . a ready-to-use weed killing compound so powerful that only 1 to 2 lbs. can destroy most types of vegetation in an area of 100 square feet! And control continues effective for long periods because UREABOR *maintains its plant-destroying activity in root zones.* Such low application rates mean greater convenience . . . less storage space for material. You'll say it's great!

Because of its granular form, UREABOR Weed Killer is easily broadcast by hand for spot treatments. Larger areas are more efficiently treated by using a mechanical spreader. For most effective distribution of the small amount of material required, we created an inexpensive, handy spreader especially for UREABOR Weed Killer.

Special Spreader now available...

The PCB Spreader applies UREABOR to best advantage, at prescribed low rates. It holds enough UREABOR to treat 1250 to 2500 sq. ft. without refilling—weighs a mere 6 lbs. Available now for just $10.75 delivered—anywhere in the U.S.A.

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PACIFIC COAST BORAX CO.

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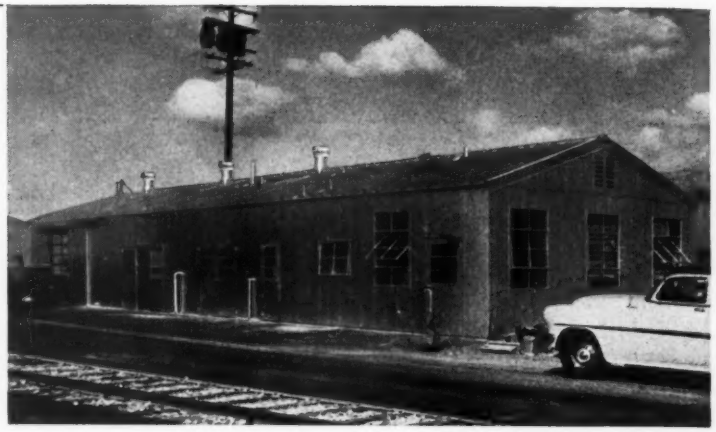
630 SHATTO PLACE, LOS ANGELES 5, CALIFORNIA

You get low-cost comfort in any climate with an ARMCO STEEL BUILDING



HOT WEATHER White, gray or other light exterior color will reduce summer temperatures inside the building. An Armco Steel Building painted white is as cool as any building can be without mechanical cooling equipment.

COLD WEATHER Interlocking STEELOX Panel joints are weather-tight. Wind and water can't get in. And any standard insulation material can be used where desired.

Whatever the weather, you *are* comfortable (and machines and equipment are protected) in an Armco Steel Building. This is one more reason why Armco Buildings are doing a lot of different jobs for more than a hundred American railroads. Some typical applications are passenger and freight stations, wheel houses, diesel engine houses, garages, offices, warehouses and others. Look at these additional benefits.

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- **Clean, attractive lines**
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- **Little or no maintenance**
- **Easily expanded to meet future needs**
- **Erection service available**

Write us for complete information on versatile Armco Buildings. Armco Drainage & Metal Products, Inc., 4926 Curtis Street, Middletown, Ohio. Subsidiary of Armco Steel Corporation. In Canada: write Guelph, Ontario. Export: The Armco International Corporation.

ARMCO®

ARMCO
Steel Buildings

1931 25 CONSECUTIVE YEARS 1956
MODERN BALLAST CONDITIONING

BEFORE *"R.B.C.C." Service*

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"R. B. C. C." ballast cleaning service has earned its outstanding performance record from 25 years of successful operation. Our 3 and 5 unit trains are entirely self contained on our own standard railroad equipment—No railroad cars are used or tied up.

"R.B.C.C." 5 unit equipment does a thorough ballast conditioning job, cleaning two center ditches or two shoulders or one of each at one trip.

"R.B.C.C." 3 unit equipment, self propelled, does a thorough ballast conditioning job, cleaning one shoulder at one pass on one side only.

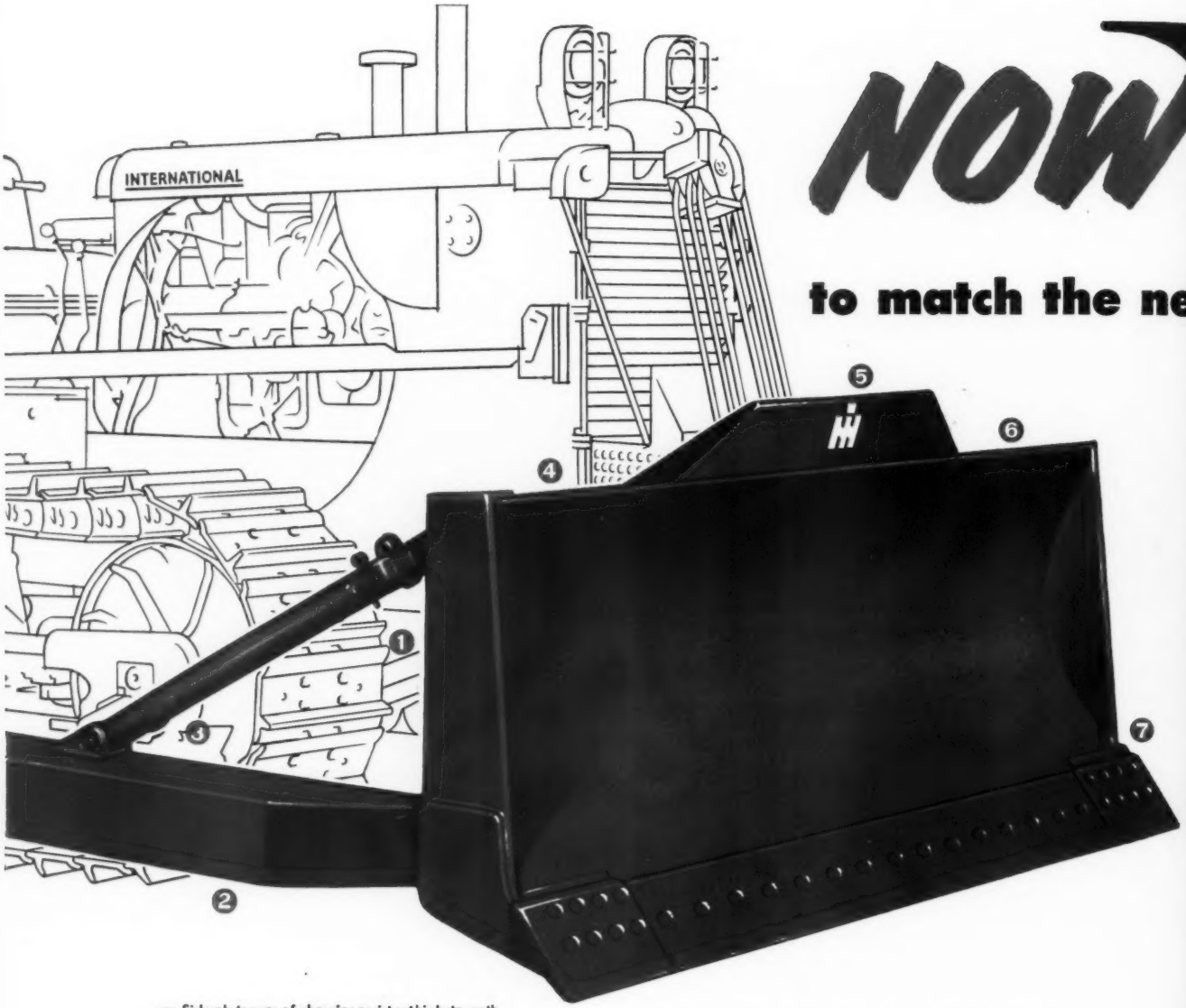
"R.B.C.C." ballast cleaning or excavating service, complete with our own personnel and equipment, is handled on contract basis.

RAND TOWER
MINNEAPOLIS, MINN.

METROPOLITAN BANK BLDG.
WASHINGTON, D. C.

NOW...

to match the new...



1. Side plates are of abrasion resistant high strength steel, securely fused to moldboard and box sections by low-hydrogen welding. They prevent load spillage, allow you to carry larger loads. Standard on all International bulldozer blades.

2. Push arms are sturdily constructed of box sections. Side plates are mill-rolled with integral back-up bars to support top and bottom plates. Machine welding guarantees uniformity of weld.

3. Headless pins, locked by eye bolts, secure struts to blade. For removal, pins can be driven out in either direction. On hydraulic blades, all control linkage is connected to the blade through self-aligning bearings.

4. Entire perimeter of blade is backed by heavy box channels solidly fused to moldboard. With this type of construction moldboard, box channels, and welds flex freely to prevent weld failure.

5. Spillboard is wide and high to prevent spillage over top of blade. Note that it is curved to match the contour of the moldboard, thus aiding boiling action. Width of moldboard allows you to carry full load for which the blade was intended.

6. Moldboard is formed from a single sheet of low-alloy, high-strength steel. International blade is shaped to perfect curvature in a special forming machine to assure uniform strength and stress resistance over entire area.

7. Shear bars welded to moldboard support end bits and relieve stress on end bit bolts. Lower edge of end plate is reinforced by wear plate to add strength at corners, increase wear resistance.

New blades designed from "ground" up

To make full use of the greater work capacity of the new Bonus-Powered International crawler tractors, we now offer a complete line of newly designed blades matched to tractor power.

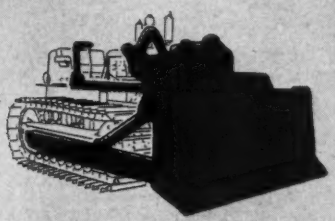
These new blades are rigidly supported around the edges by box sections to give the blade strength but also permit the moldboard to "breathe" under load stresses. New automatic welding processes guarantee that the welds in International blades will hold up under *any kind of job conditions.*

International blades will last far longer and give you far less trouble than any others you have ever hung on any tractor. When you inquire about the new line of Bonus-Powered International crawler tractors, ask your International Industrial Power Distributor for all the facts about the new line of matching blades. See for yourself that they are the best designed, best constructed on the market.

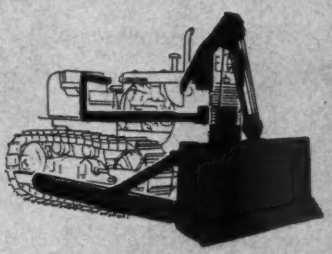
Write For New Blade Literature: An illustrated specification list of the *228* attachments available for International crawler tractors is just off the presses. For your free copy of Mailing Folder CR-492-F, write Consumer Relations Department, International Harvester Company, 180 North Michigan Avenue, Chicago 1, Illinois. No obligation, of course.

...42 new blades

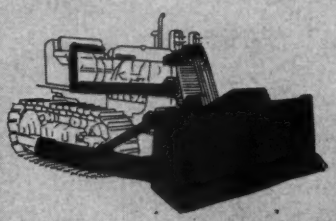
Bonus-Powered International crawlers



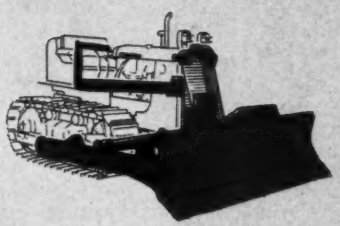
Direct Lift Hydraulic Bulldozer
Operates off front-mounted, gear-driven pump which gives fast blade action. Self-aligning bearings prevent binding of linkage.



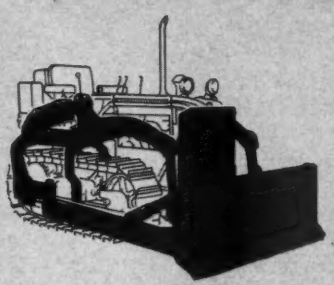
High-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control unit. Available for TD-24, TD-18, and TD-14 tractors.



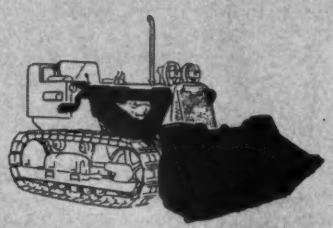
Low-Gantry Cable Bulldozer
Operates off either front or rear-mounted International cable control units. Available for TD-24, TD-18, and TD-14 tractors.



Hydraulic or Cable Bullgrader
Operates off high or low gantry, front or rear cable controls on TD-24, TD-18, and TD-14 tractors. Hydraulic bullgrader also for TD-9, TD-6, and T-6 tractors.



Track Frame Mounted Bulldozer—Distributes the load evenly over the length of the tracks. Available only for TD-9, TD-6, and T-6 tractors. Bullgrader also available.



International Drott "4-in-1"
Newest of International Drott loaders. Combines Skid-Shovel, Bull-clam, clamshell, and bulldozer in one unit. Available for TD-14, TD-9, , and TD-6 tractors.

INTERNATIONAL HARVESTER

International Industrial Power

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A COMPLETE POWER PACKAGE INCLUDING Crawler, Wheel, and Pipe-Boom Tractors . . . Self-Propelled Scrapers and Bottom-Dumps . . . Tractor and Rubber-Tired Loaders . . . Diesel and Carbureted Engines

Above left, oxygen cut being made in deck of old bridge. Directly above, old bridge is dwarfed by new lift span.

One of the first ALL STEEL STRUCTURES...

Goes the fast, efficient way of oxygen cutting

Sixty-three years old, and one of the first all steel structures built in the United States, the steam operated swing span, shown at left above, has carried up to 140,000 passengers a day in and out of New York's busy Manhattan Island. After suffering the mechanical ills of old age, this New York Central Railroad bridge was skillfully removed by using LINDE oxygen cutting.

The old bridge had a four track right of way with a girder structure separating tracks 1 and 3 from 2 and 4. After the tracks were taken up, the deck of the bridge was divided by a series of transverse and longitudinal cuts, and removed. Super structure beams were next to be cut off. Finally, the main side girders were cut into portable lengths and lowered away.

Oxygen and acetylene gases were supplied to the cutting torches by centrally located LINDE cylinders manifolded together.

No matter what your fabricating, repairing, or scrapping needs may be—LINDE can help you do the best job, in the least amount of time. Call your local LINDE representative for detailed information on LINDE's processes—or write for specially prepared literature. Start saving now, do it today.

RAILROAD DEPARTMENT

Linde Air Products Company
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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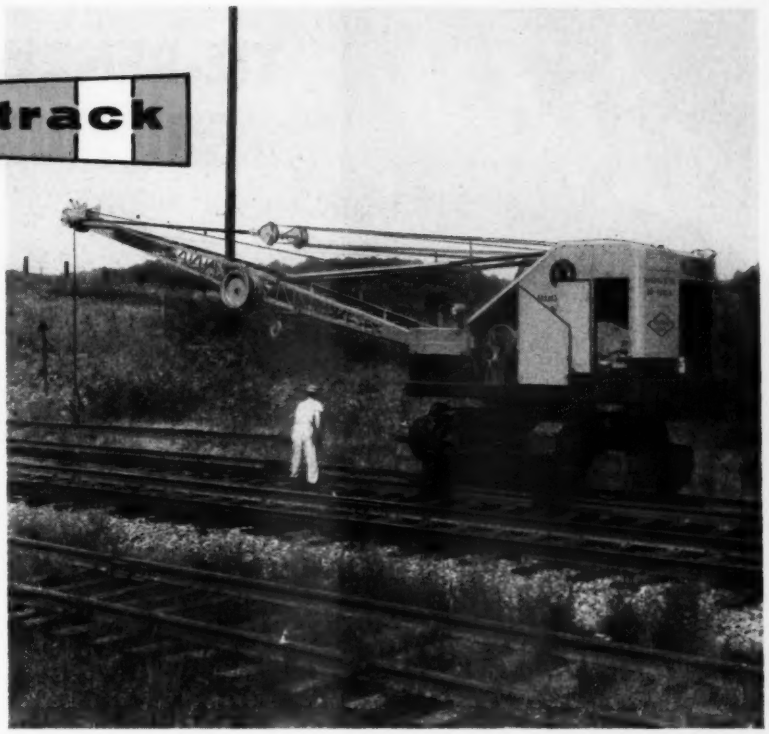
Division of Union Carbide Canada Limited, Toronto

Supplying to railroads the complete line of welding and cutting materials and modern methods furnished for over forty years under this familiar symbol . . .

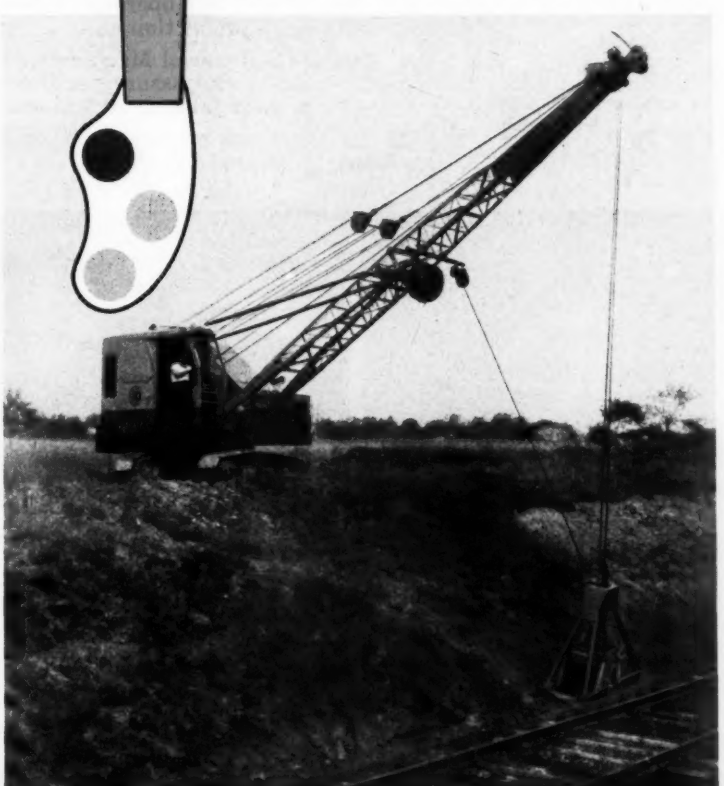
"Linde" and "Oxweld" are registered trade-marks of Union Carbide and Carbon Corporation.

on track

Koehring 205 RailAid powers its own rail car. It travels on-track from one work section to the next at speeds up to 20 m.p.h. — works on or off-car with all standard excavator or crane attachments. You can send it anywhere along the line or in yards at a moment's notice to do any digging, lifting or material-handling. Does 2 to 3 times the work of ordinary excavators or cranes that have to crawl or be hauled from job to job. Propulsion car has 2-axle drive, with airbrakes on all 4 standard-flange wheels. Torque converter gives smooth control of travel speeds. Car-well accommodates 16, 20 or 24-inch crawlers on the heavy-duty excavator or crane.



off-track



In less than 10 minutes, Koehring 205 loads or unloads itself on the ramp equipped propulsion car. Crane or excavator sets the car on or off-track, clears the right-of-way for normal traffic. Work of the 205 and road crew is uninterrupted during the entire shift. This on and off-track flexibility is combined with big work capacity. As a crane, the heavy-duty 205 safely lifts 6.9 tons from the car — 8.9 tons on the ground. It readily converts to clamshell, dragline, pile-driver, ½-yard shovel or hoe. This versatile 205 RailAid is widely used by many of the country's leading railroads (names available on request). Better get all the facts on what it can do for you.

SAVES TIME ON ALL THESE JOBS:

Ditching
Rail laying
Stockpiling
Piledriving
Wrecking
Salvage
Grading
Clearing slides
Widening banks
Repairing trestles
Erecting bridges
Setting steel
Loading cars
Storing parts
Handling: timbers, ties, ballast, ash, coal, scrap

Write us today for new RailAid bulletin:

K657

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Matisa

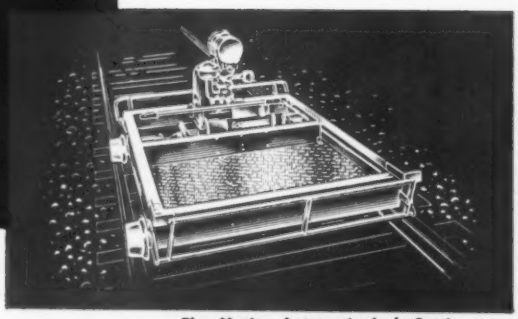
TIE-RENEWAL MACHINE

This one machine can give you double duty . . . rolling old ties out and new ones in at a high production rate and a commensurately low unit cost.

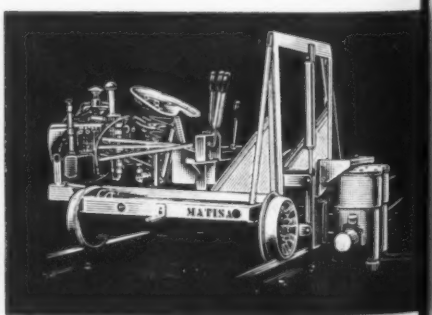
This versatility makes it economical either when used as a single all-purpose device by small gangs or when operated in multiple units with large production gangs.

Use Matisa Tie-Renewal Machines to cut tie installation costs and assure maximum production from your tamping machines.

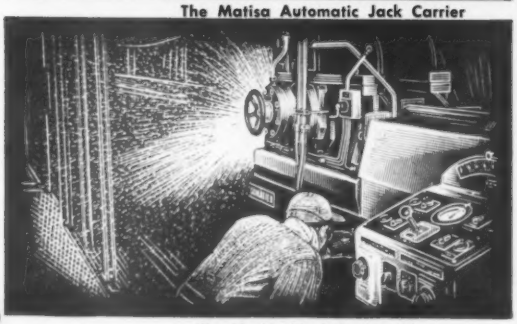
Send for literature on this or other Matisa Machines illustrated below.



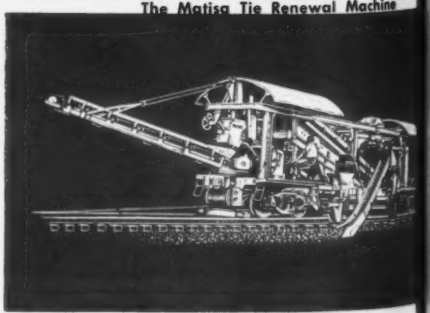
The Matisa Automatic Jack Carrier



The Matisa Tie Renewal Machine



The Matisa Flash Rail Welder



The Matisa Ballast Cleaner

Matisa

EQUIPMENT CORPORATION

1020 WASHINGTON AVE. • CHICAGO HEIGHTS, ILLINOIS

News Notes

. . . a resumé of current events throughout the railroad world

RAILWAY
TRACK and STRUCTURES
MAY, 1956

Experimental closed-circuit television on the Rock Island's new "Jet Rocket" offers passengers an opportunity to see the trip as though they were in the locomotive cab.

•

One major railroad and a large railroad supply company are studying the practicability of a box car in which the doors, sides, ends, roof and even structural members are made of glass fiber.

•

Demands for a 25 per cent wage increase, and penalty payments for holiday work, have been served on all railroads having contracts with the Switchmen's Union of North America.

•

An approved method of track sanding has been developed by the Southern Pacific, which is said to reduce the amount of sand deposited on the rail by 83 per cent.

•

Expenditures for maintenance of way and structures by Class I railroads in January 1956 were $105,371,339, an increase of $9 million, or 9.3 per cent, compared with the corresponding month last year, according to the Interstate Commerce Commission's Bureau of Transport Economics & Statistics.

•

Carloadings for the second quarter of 1956 will be the largest of any spring quarter since 1952, according to estimates of the National Association of Shippers' Advisory Boards. The estimates also place them higher than for any three-month period since 1953.

•

Estimates submitted to the Interstate Commerce Commission by 124 Class I line-haul railroads indicate that their gross capital expenditures for 1956 are expected to be about $1,269 million. That would be $399 million, or 45.9 per cent, more than their 1955 outlays.

•

Class I railroads in February had an estimated net income of $47 million, compared with $46 million for the same month last year. Because January's net was down $6 million from that of January 1955, the two-month total was off $5 million—$93 million compared with $98 million last year.

•

Two ocean-going tankers were expected to begin transporting 33-ft trailer bodies on specially fitted decks between New York and Houston, Tex., last month. Each tanker accommodates 58 fully loaded vans without affecting its basic oil carrying capacity. The trailers are delivered to and from shipside by special highway truck chassis.

•

The New York Central has revealed plans for revamping and streamlining the freight yard facilities throughout the system. The first phase of the project, to cost over $25 million, will involve the yards at Buffalo, N. Y., Youngstown, Ohio, and Elkhart, Ind. Work is already under way on a $10,559,000 project at Buffalo in which eight existing yards will be replaced by a single electronically controlled hump-retarder classification yard.

How "D" Handyman restores embankment shoulders, speeds maintenance for A. T. & S. F.

Cleaning drainage ditches is one of the many uses put to A.T. & S.F.'s D Tournapulls. This is an ideal project for "D's" rapid speed and mobility.

The Atchison Topeka & Santa Fe uses 3 off-track rubber-tired D Tournapulls to handle scattered maintenance along its right-of-way.

For example, on the Pecos Division, 5 miles east of Willard, New Mexico, the A.T. & S.F. restored embankment shoulders.

At one location the rubber-tired 138 hp D Tournapull hauled material from cuts at each end of fill. The material was a mixture of clay, sand and caliche. Tournapull self-loaded an average of 5 yards at each pass and spread its load along the fill in thin lifts. Travel back and forth on "D's" big low-pressure tires provided firm compaction.

Tournapull delivers load of sandy clay and caliche, mixed, to restore embankment shoulders.

The "D" worked in a "figure 8" pattern on the 2000′ cycle, averaging two loads in 5 minutes, for a total of 22 loads per 55-minute hour. This gave an output of 110 yds. per hour.

The Railroad "Handyman"

A.T. & S.F. also use their "D's" to dig and clean drainage ditches, trenches for culverts, remove drifting sand, build and repair access roads, and many other "handyman" maintenance assignments.

The "D's" ability to travel under its own power cross-country as well as on highways and along rail roadbeds, makes it an ideal tool for railroad maintenance. The D Tournapulls are liked for roadability — if a rig is needed at a new location several miles distant, it reaches the job with a minimum of lost time.

"D" advantages

Another factor is its ease of operation and maneuverability. The "D" turns around in an area only 26′ wide. Operators like the electric-controls on this Tournapull. They particularly like the way they can maneuver in close quarters, and on this job there is a lot of close-quarter work.

It will pay you to investigate this versatile rubber-tired machine. Ask your LeTourneau-Westinghouse Representative for detailed information on how the "D" can cut ditches, spread ballast, travel from job-to-job at speeds up to 28 mph, for fast, low-cost handling of scattered maintenance and railroad construction.

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D Tournapull spreads load on the run.

Self-loading, D Tournapull gets about 5-yard load for fill. "D" loads at both ends of cut.

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20-page book shows how 7½-yd. self-loading D Tournapull cuts time and costs on right-of-way maintenance. Send coupon for your free copy. No obligation. Also ask to see our color movie, "Clear the Track".

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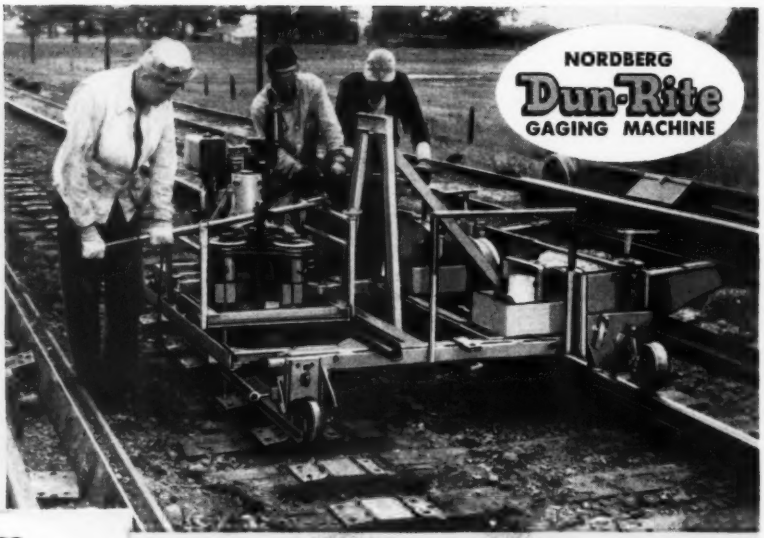

. . . get better riding track with these 2 NORDBERG *"Mechanical Muscles"*®

● *With the Nordberg Dun-Rite,* the gaging operation follows right behind the Adzers and fastens the tie plates to the ties in exact position, so that when the rail is placed the head-to-head gage is correct. The Dun-Rite method is base gaging and it is actually the outside shoulder of the tie plate which is gaged. *Write for Bulletin 220.*

With the self-contained, self-propelled Nordberg Trakliner, you can line track in connection with track raising, spot surfacing, new work or improvement programs at amazing savings. The Trakliner uses easily controlled hydraulic power to line the track any desired amount. Two men and the Trakliner will line all the track a gang can raise or spot surface in a day. *Write for Bulletin 230.*

Many major roads have proved that these two sets of Nordberg "Mechanical Muscles" have given them better gage, better line and hence better track—at appreciable savings in time and maintenance dollars . . . another example of the advantages you get by using Nordberg Track Machinery.

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NORDBERG MFG. CO., *Milwaukee, Wis.*

NORDBERG MACHINERY

How to get long-lasting control of vegetation on right-of-ways and in yards...

Note how "Telvar," used in combination with other herbicides, has helped to keep the road-bed area free of vegetation.

Du Pont TELVAR® Weed Killers, used separately or in combination with other herbicides, provide long-lasting weed control that can help cut your maintenance cost to new low levels.

"Telvar" not only kills vegetation, but also prevents regrowth because of its season-long residual action.

"Telvar" weed killers come as wettable powders, are non-corrosive, non-flammable, non-volatile, low in toxicity to humans and livestock.

For weed control on right-of-ways and in yards, include "Telvar" weed killers in your program. Railroad custom applicators are prepared to apply "Telvar" weed killers alone, or in combination with other herbicides, either as sprays or in dry form.

• • •

Brush along right-of-way was controlled with "Ammate." Note the leafless dead stems of brush in this photograph taken 90 days after application.

Where brush is a problem, either Du Pont AMMATE® X Weed and Brush Killer or "Ammate" solution is the product you need. "Ammate" kills more kinds of brush with unusual safety. With ordinary precautions, it may be used close to such crops as cotton, tomatoes, soybeans, peanuts and others.

For free illustrated booklet (A-995), or if you would like to have a Du Pont representative call, write Du Pont, Grasselli Chemicals Dept., Wilmington 98, Del. In Canada: Du Pont Company of Canada Ltd., 80 Richmond St. W., Toronto.

On all chemicals, follow label instructions and warnings carefully.

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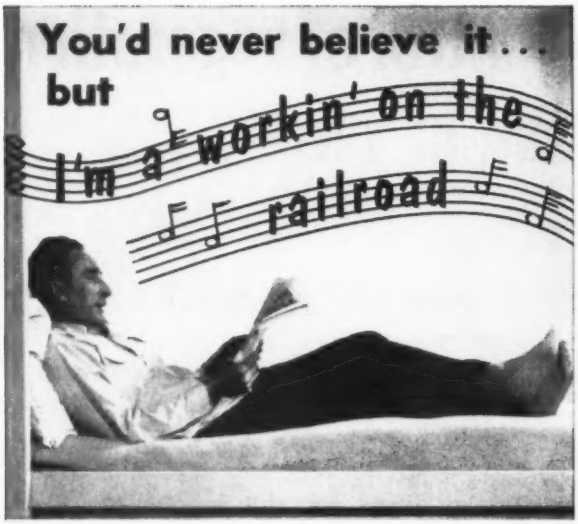

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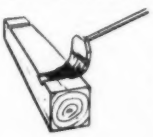

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AFTER a pass with the plow to skeletonize and renew ties, sled was used to put a uniform 5-inch layer of new ballast under the ties.

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NOW . . . a job-proven *plow* method of ridding cribs of badly fouled ballast even under wet and muddy conditions, settles track on original bed ready for sled-ballasting and raising. Plows are available to work either single or double track. . . . a job-proven *sled* method of raising track on newly unloaded ballast or utilizing existing crib material for sub-ballast. Pefected by MANNIX, this new plow-sled team is now extensively employed by several leading roads, with overall cost savings of one-third on track maintenance and complete rehabilitation projects.

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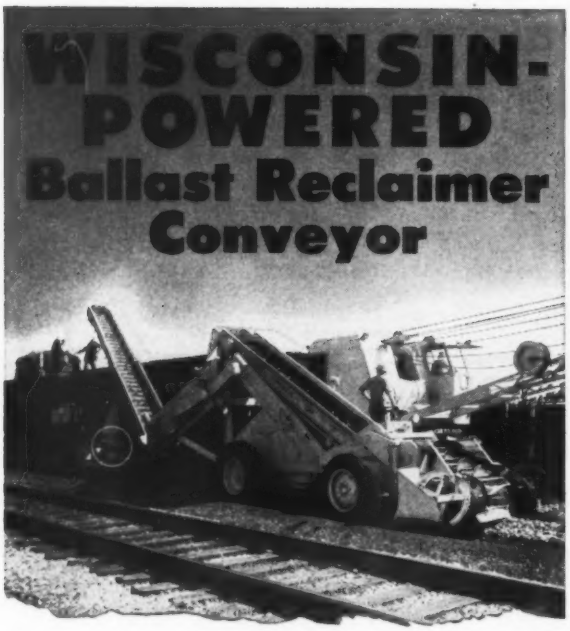

Helps save $1.00 per ton over cost of new ballast!

This time- and money-saving Athey 125 HiLoader and elevating conveyor picks up old ballast, cleans and loads it at a saving of more than $1.00 per ton over the cost of new ballast, according to the manufacturer (Athey Products Corp., Chicago, Ill.), and is capable of loading two 70-ton hopper cars in one hour . . . low-cost ballast, ready for re-use.

Coordinating the loading ability of the HiLoader with the Athey shaker screen and elevating conveyor, old ballast is processed and reclaimed at an average cost of less than 15 cents per ton (including owning and operating costs per hour of the Ballast Reclaimer as well as owning and operating Dozer costs per hour to prepare bed for pickup).

A Wisconsin Heavy-Duty Air-Cooled Power Unit operates the elevating conveyor, moving the cleated belt at a rate of 600 ft. per minute, loading a 70-ton gondola in 28 minutes. Hydraulic controls raise or lower the elevating conveyor to fit any railroad car and swing it up to 17° right or left of center.

This is a typical tough, dirty railroad job that calls for tough, rugged Wisconsin heavy-duty engine power. Tapered roller bearings at both ends of the crankshaft; dust- and weather-sealed outside magneto; positive, pump-circulated lubrication, efficient AIR-COOLING at temperatures from sub-zero to 140° F. are some of the reasons why Wisconsin Engines are the *preferred* power for this type of service.

Wisconsin Heavy-Duty Air-Cooled Engines are supplied in 12 different models, in a complete power range from 3 to 36 hp. Electric starter and generator or starter only available on all models. Pre-cleaner and rotating screen can be supplied for engines working under dirty conditions. Special equipment must be specified at time engines are built.

For more information, write for Bulletin S-188. And for top performance, low-cost maintenance and long engine life specify "WISCONSIN" for your maintenance-of-way equipment.

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This railroad *Saves* by "blitzing" brush the Bogle way.

There are other ways of going after brush, of course, but in this high cost labor era, you're looking at the method a railroad can best afford. Grubbing, cutting and burning are costly and not as effective, time-wise. As for speed, there's no comparison. Miles-per-hour, not days-per-mile is the way you measure the progress of the Bogle spray train.

Naturally, the right chemical in the right concentration is important. 2,4-D and 2, 4,5-T and Ammate are among the best for brush control. The amount and frequency of application are things which Bogle recommends only after careful study of conditions on your road. If you would like the benefit of 32 years' experience in just one thing—vegetation control—get in touch with Bogle without obligation.

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Complete Weed and Brush Control Service

RAILWAY

TRACK and STRUCTURES

Subject: **Rating Your Road**

Dear Readers:

How do you evaluate the maintenance standards and methods in use on your road in comparison with those of other lines? In your opinion, is your company way out in front, or lagging far behind, or about in the middle? Are you proud of what your company is doing, or do you feel that its accomplishments fall far short of those on other lines?

There may be a tendency, when considering these questions, to adopt one of two extreme attitudes. One of these is to take the position that "my company can do no wrong; its practices are perfect in every way, and that's that." At the other extreme is the man who says, "We don't do anything right on our road. The people who make decisions always use poor judgment. If they would only take my advice we would be going places instead of standing still."

What happens when we have these attitudes. To be happy in his work a man must, to a degree, be proud of his company and of its policies. But if he allows his pride to blind him to any shortcomings that may exist, he is doing himself and his employer a disservice. Why? Simply because he is shutting out the thought that it is possible for a company to profit by adopting—or adapting—practices developed and perfected on other roads.

No person or company is perfect and omnipotent. No person or company can be entirely self-sufficient and independent of aid from others. To admit the truth of these statements is a primary requisite to progress. In fact, the mark of true progressiveness is the ability to select from advanced practices in use by others the ones that are best suited to our own needs and conditions. In other words, be proud of what you are doing on your road, but don't rule out the possibility that you can learn a thing or two from the other fellow.

The other extreme attitude—chronic dissatisfaction with the policies in use on one's own road—can also have unpleasant results. This is an attitude of resignation and defeat. One who has it has made up in his mind that the situation is hopeless; with this negative viewpoint he is not likely to have much initiative or to make more than a feeble effort to improve matters.

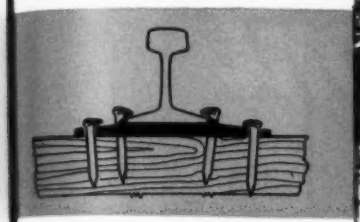
The two extreme attitudes pictured here have been purposely overdrawn. We doubt that either of them is actually ever encountered. It is probably correct to say, however, that occasionally some of us tend to *approach* one or the other of them. There are some of us who have a tendency to become a little too cocksure about the superiority of our own practices. On the other hand, there are others who are perhaps too prone to belittle the policies in use on their roads. These attitudes, each in its own way, are self-defeating.

We can be proud of what we are doing and still not lose sight of the need for further improvement; and, when we ponder over the inadequacies of our practices, it should only be for the purpose of finding ways to improve them.

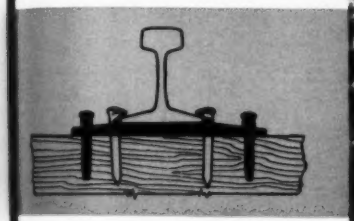
MHD

HOW IT WORKS

The Racor stud is not an ordinary hold-down device. Rather, it works by preventing *lateral* movement of the tie plate—which research reveals to be the important cause of tie wear. In preventing lateral movement, it also improves holding of line and gage.



Anchor spikes seldom anchor. The loose fit in the tie plate hole lets the plate work sideways and wear the spikes. This causes wide gage and rapid tie wear.



The Racor stud forms an integral unit with the tie plate. The entire length of the stud shank resists side thrust. Lack of "play" reduces plate motion —holding better line and gage, cutting tie wear in half.

Your own test track will prove what this curve installation has shown: that easily installed Racor studs really *work!*

A. R. E. A. TESTS SHOW:

Racor® studs reduce plate-cutting by half... maintain line and gage best

The recent A.R.E.A. report on the L & N tie wear test confirms years of laboratory findings on the unique Racor accelerated wear machine: namely, that Racor studs reduce plate cutting by about 50% and that they maintain line and gage with least variation. In this test, the Racor studs have had no cyclic maintenance.

In 95 other tests by 38 leading roads, these findings are being further substantiated. As a result, almost 1,000 miles of Racor studded track are now in operation . . . and many more soon will be.

The Racor stud is by far the most economical device for protecting ties and holding line and gage. For less than 6¢ a tie more than anchor spiking, you can substantially extend tie life and greatly reduce track maintenance. This year's investment in Racor studs will pay off handsomely for many, many years to come.

Why not check up *now* on your nearest Racor stud test track? Your Ramapo representative will be glad to help you evaluate results . . . and give any further information.

A-1149

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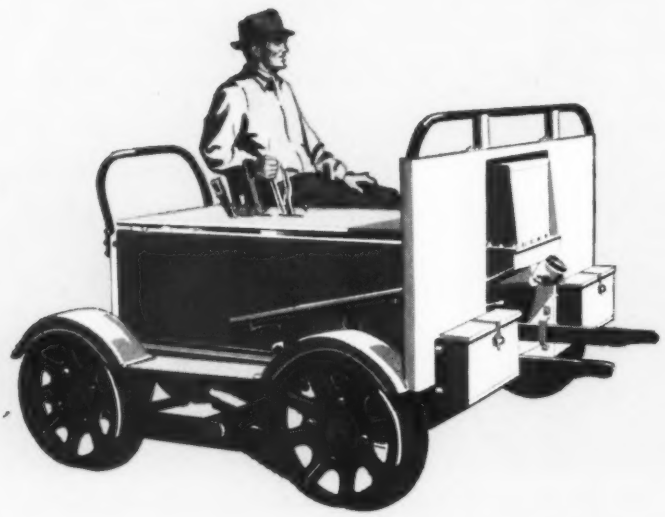
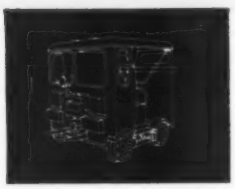


M19 SERIES AA One- to Four-Man Inspection Car offers a new two-cylinder Fairmont engine, demountable wheels and four-wheel braking. Soundly engineered and soundly built, this vehicle provides a load capacity of 750 lbs.

M19 SERIES F One- to Four-Man Inspection Car employs a 5- to 8-horsepower roller bearing engine, a new engine stabilizer and four-wheel braking. Like all Fairmont products, it offers great dependability and economy.



M9 SERIES G One- to Two-Man Inspection Car features an efficient roller bearing engine, enclosed housing and adjustable lift handles. Only 540 lbs. in weight, it offers unusually high standards of performance.

MR19 SERIES A One- to Four-Man Inspection Car provides two-way drive, four-wheel braking, enclosed housing and a 5- to 8-horsepower engine. Performance characteristics include unusual safety and maneuverability.

The final responsibility for every maintenance job falls to inspection. And that is why the overwhelming majority of lines have standardized on Fairmont inspection cars. They know that only by relying on the world's leading manufacturer of railway motor cars can they procure the maximum of efficiency, dependability and performance. Equally important, they know that only Fairmont offers the variety of car designs that enables them to select precisely the correct equipment for every inspection task. And they know, too, that every Fairmont inspection car offers sound construction . . . scientific engineering . . . unusual simplicity of operation . . . and all of the other qualities which have made Fairmont synonymous with quality and craftsmanship. The next time you think of inspection . . . follow the example of experienced railway personnel the world over. Think of Fairmont—the most respected name in railway maintenance!

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RAILWAY

TRACK *and* STRUCTURES

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COMPRESSION LUG GIVES . . .

New BULLDOG RAIL ANCHOR 25% greater holding power

True Temper's new BULLDOG Rail Anchor holds rail in a powerful, new, two-way grip. As shown in transparent model above, high-spring tension (force A) pulls the clamp against the rail base. This tension alone assures high anticreep properties. But now, by the addition of a pair of forged lugs (whitened area on model), the anchor is also under heavy compression (force B) which pushes upward on the rail base and squeezes it between the spring and clamp.

Result: Unmatched holding power 25% greater than our previous model.

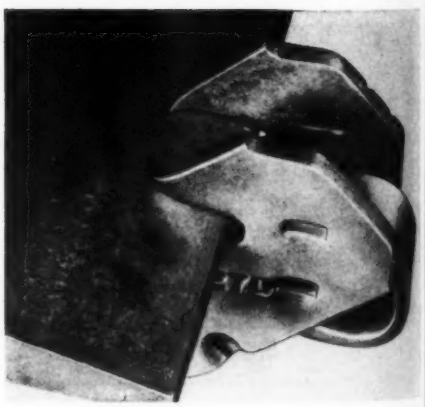
Double-Jawed Grip

With its powerful double jaws, the new BULLDOG will retain its holding power through years of pounding service. And on reapplication, even better than its predecessor. It's the ideal anchor for all applications, especially where high anti-creeping properties are required. Welded rail, for example.

One-element Anchor, Two-piece Design

We heat-treat the clamp body for high hardness and wear resistance, the spring separately for high-tension holding power. Steel of such different analysis is obviously impossible in a one-element anchor. BULLDOG anchors are shipped (in handy 10-anchor bundles) and applied as one unit by one man, using any striking tool. Moreover, because of extra depth in the take-up slot, the anchor fits new or worn rail, can be reapplied with no loss of holding power, and can't be overdriven.

Write for more information and *free application chart*, or have a True Temper representative call. True Temper Corporation, Railway Appliance Division, Cleveland 15, Ohio.



IDEAL FOR WELDED RAIL—Only True Temper BULLDOG has tension *and* compression, plus this double jaw that grips the rail at two points. Squeezed in two directions, the rail is held in a vise-like grip. These qualities make the BULLDOG perfect for the requirements of welded rail.

OTHER TRUE TEMPER RAILWAY PRODUCTS: BULLDOG Ballast Forks, Weed Cutters, BULLDOG Shovels, BULLDOG Safety Rail Forks, Hammers, Sledges, BULLDOG Scythes.

TRUE TEMPER® BULLDOG RAIL ANCHOR

25% greater holding power . . . one unit . . . applied by one man . . . using any striking tool

What's in Your Unit Costs?

The need for reliable and dependable unit costs has never been greater than it is today. Basically, there simply isn't any other way of measuring the performance of specific maintenance of way operations or gangs.

On individual railroads there is usually some degree of uniformity in figuring unit costs. In other words, when the performance of two different gangs on the same road is under consideration the probability is that the figures used will be fairly comparable. Which is to say they will include the same elements and allowances for such items as interest, depreciation and supervision, in addition to out-of-pocket expense.

But so many of the comparisons being made today are between gangs or operations on different roads. The competitive spirit is in evidence here. Many roads want to excel others in developing efficient practices, and as proof they cite unit costs.

The effort to excel is commendable. The trouble is that cost figures developed on different roads are frequently not comparable. Disparities show up very quickly when the discussion gets down to details. For one thing, they do not always include the same direct or out-of-pocket expenses. For another, such items as interest, depreciation and cost of equipment repairs may be handled quite differently, or not included at all.

For these reasons maintenance officers on one road frequently regard with suspicion cost figures cited by their colleagues on other lines. This is a situation that needs to be corrected. Uniform methods of figuring unit costs are necessary in order that maintenance men can be sure they are talking the same language when comparing practices and costs.

The American Railway Engineering Association would be laying the foundation of a great service to the industry if it were to initiate a study aimed at the development of a "universal language" for figuring unit costs.

That Perennial Drainage Problem

One of the surprising things that a railroad man sees when traveling around the country in the spring of the year is the great need for drainage correction. Through station grounds he sees pumping joints, mud-spattered rails, switch-tie cribs with standing water, sloppy railroad crossings, and rails at highway grade crossings sinking easily under load.

Beyond the station grounds he sees water standing adjacent to railroad embankments (even though adjoining farmland may be completely drained), pools formed around piles of new ties or ties unloaded in water-filled side ditches.

In view of all that has been written about the importance of proper drainage and the instructions issued, the railroad traveler cannot help but wonder what is wrong that such conditions continue to exist year after year.

The section foreman certainly cannot be oblivious to these conditions because his work of achieving a satisfactory riding track is increased when the underlying track support is weakened by water saturation.

The supervisor must also be aware of the large amount of time his track forces spend on certain stretches of track. He must know that the correction of poor drainage at these locations would release manpower for essential work elsewhere.

Why, then, aren't corrective measures taken? The railroad traveler surmises that much of the blame for these conditions is apathy. A stranger to the locale will observe the places where corrective measures are necessary, whereas the local men are accustomed to the poor conditions.

Probably the only way to make certain that these poor drainage conditions will be eliminated is to undertake a specific campaign with that objective, and then see that it is carried out.

Panelists at AREA Convention . . .

. . . Talk About Ties

Service life—overlength ties—uses of second-quality ties—anti-splitting devices—adherence to minimum dimensions—artificial seasoning—use of mixed hardwoods—results from incising.

L. C. Collister

● Questions about ties don't always get the same answers from the experts. A number of differences of opinion came out during a panel discussion at the annual convention in March of the American Railway Engineering Association. But the discussion is of interest mainly because of the many facets of the subject that it covered. Here is what was said:

Mr. Collister: *Mr. Brentlinger, what are the advantages and disadvantages of acceptance inspections performed after the seasoning period as compared to inspections before seasoning—that is, dry inspection versus green inspection?*

Mr. Brentlinger: The advantage in the inspection of the dry tie is that the inspector is able to see pronounced defects that develop during the seasoning period. These defects are not always visible at the green stage, but they are more visible and pronounced after a year's seasoning.

The disadvantage in the inspection of dry ties is that the company that is buying the ties has very little control over the proper stacking, spacing and the separation of species in the stack.

What Is the Service Life?

Mr. Collister: *Mr. Burt, how many years of service may we expect from a new, treated, first-quality, main-track crosstie, under the most unfavorable conditions that are conceivable?*

Mr. Burt: That's a little difficult to answer. Any estimate of the service life of ties should be made only after a most careful evaluation of all of the determining factors, such as weight of rail, ballast, drainage, speed and density of traffic, curves and, probably more important than all, changing climatic conditions. It is very important to know as much as possible about all of those conditions before we attempt to compare the performance of ties on one railroad with those on another. All of those factors are vital, and they vary a great deal in different areas.

In my opinion, ties in main track, under most unfavorable conditions, should last from 10 to 18 years; under more average conditions, 18 to 25 years; and under the most favorable conditions, from 25 to 35 years.

Mr. Collister: *Mr. Duncan, why are railroads expected to accept overlength ties when it is known that various ballast-cleaning machinery will not clear such ties?*

Mr. Duncan: Years ago, before we bored and adzed ties, and before we had the type of work equipment we now have to perform on tracks, very little attention was paid to the length of ties. Our AREA specifications had a tolerance 1 in shorter and 2 in longer in length than specified. The adherence to that was generally not too good, but we were not too much concerned about it. Later, we found that we received a great many ties that we couldn't get through the boring and adzing plants because they were too long. We found that irregular ties interfered with the use of some of the ballast machines, and other machines used.

Some years ago our specification was changed so we would permit no ties under the specified length. They could be 1 in over in length. Since that time we have had some difficulty securing all the ties we have wanted with the exact tolerance. However, generally, there has been quite a definite improvement. While we sometimes get some that are not within our present specification, the majority of them are.

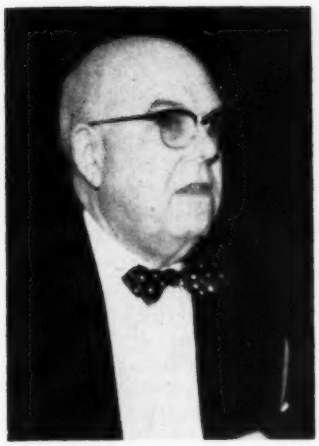
I think the only reason that any of them are offered is because some railroads, perhaps, don't have the type of equipment that makes it necessary to adhere to the specification; and oftentimes, then, the producers expect us all to accept those ties. It can't be done.

As I said, there has been improvement, and I expect that there will be further improvement, so that ties will all be satisfactory to us. I know some of the problems that the producers have, but if they will start out in the woods, where they cut their ties, and try to get away from as much yard work as possible, I think they can give ties as they should be.

Using Second-Quality Ties

Mr. Collister: *Mr. Burt, taking into consideration our present transportation, handling and track labor rates, is it practical to purchase second-quality ties for use in branch lines, side tracks and yards?*

Mr. Burt: In my opinion, ties of second quality should not be used in branch lines, yards or sidings. To do so does not provide the greatest return on the investment, dollarwise. It has been our experience that many ties in these tracks fail because of decay; accordingly, I believe that ties of the best quality should be used in these places. Very probably, they should be



H. R. Duncan

P. D. Brentlinger and L. W. Kistler

L. P. Drew and C. S. Burt

given greater protection against decay through heavier retention of preservatives.

Mr. Drew, what use can be made of crossties not meeting first-quality specifications?

Mr. Drew: This is a rather controversial question, but for those railroads where first-quality ties are difficult to obtain, and they are forced to take second-quality ties—or rather, ties that do not meet first-quality specifications—they cannot afford to just cast them aside. They must be used.

These can be used in sidings, unimportant branch lines, back tracks, industry spurs and, as previously stated, in tracks which possibly will be abandoned before too many years.

There are other uses for the poorer qualities, which we have found of considerable advantage. They can be used for cribbing, for sills on unimportant buildings, and for the blocking of loads in cars, where we have a considerable problem, particularly with heavy machinery and structural steel in open-top cars. A shifting load is a rather expensive hazard, and we have found that these low-quality ties are very suitable for that service; they are used up in one trip and that's the end of them. Otherwise, we have to go into the market and buy rather expensive lumber.

Mr. Collister: *Mr. Brentlinger, is it economical to use anti-splitting devices, and to what limit should they be used?*

Mr. Brentlinger: I believe everyone is familiar with the fact that if there are no anti-splitting devices in a tie that is split in track, the split will continue until the tie is of little value.

There are two ways commonly used for applying anti-splitting irons: (1) Inspection of ties and the application of irons to the ends of ties that have incipient checks or splits; or (2) 100 per cent application of irons on the basis that the tie may split in track.

Once the tie is in track, there is no economical way to close the split. Therefore, anti-splitting irons should be used on those ties that show incipient checks, or in species which we know are very likely to check.

Mr. Collister: *Mr. Kistler, why should minimum width, thickness and length be adhered to?*

Mr. Kistler: Under present conditions of heavy-tonnage, high-speed trains, if the smooth-riding characteristics of the track are to be maintained, it is important that each tie transmit the loads to the roadbed as uniformly as possible. To do this means that the ties must have nearly equal bearing areas, both at the bottom and also on the sides, for there is considerably more stress on the sides of the tie than we sometimes realize.

There is another factor. With the increasing trend toward mechanized maintenance of track, it is more or less understood that the more uniform the ties are in size, the closer are the tolerances to which these machines can work, a fact that enhances the efficiency of their performance.

Where — When — Who

This feature of the AREA convention took place at the Palmer House, Chicago, March 15, the last day of the meeting, and was sponsored by the association's Committee on Ties. The panelists were selected for their knowledge of various aspects of the subject. They are:

L. C. Collister (moderator), manager, tie and timber treating department, Santa Fe System, Topeka, Kan.
H. R. Duncan, superintendent timber preservation, Chicago, Burlington & Quincy, Galesburg, Ill.
P. D. Brentlinger, forester, Pennsylvania, Philadelphia
L. W. Kistler, tie and timber agent, Frisco, St. Louis
L. P. Drew, assistant chief engineer, Union Pacific, Omaha
C. S. Burt, assistant to vice-president purchases and stores, Illinois Central, Chicago

Views on Artificial Seasoning

Mr. Collister: *Mr. Duncan, since many hardwoods will damage before they are sufficiently dry to prevent additional seasoning checks developing after treatment, and when the ties are in track, is it economical to employ artificial methods of seasoning?*

Mr. Duncan: That is a subject on which there is a considerable difference of opinion, even in our own committee.

If hardwood ties can be purchased, shipped, handled and separated by species, and only one specie treated in a charge after satisfactory air seasoning, and before they are damaged by decay, satisfactory results can be secured. However, if mixed species are stored in

one seasoning pile and treated in the same charge, we are frequently confronted with the problem of waiting until all the ties are air seasoned sufficiently to permit treatment, and some of the species that season more rapidly may be decayed.

On the other hand, if we attempt to treat them before they are all properly air seasoned, then we may not secure satisfactory penetration of the preservatives, and we can expect further checking and splitting after treatment.

Some of us are of the opinion that it is economical to incise hardwood ties when they are green. In our opinion, this results in less severe checks and splits, but results in a greater number of smaller checks and splits in some species, but not all. It improves the penetration of the preservatives.

Others feel that it is economical to employ other artificial methods of seasoning, such as Vapor Drying, controlled air seasoning, and others. I have observed a considerable amount of work that has been done by artificial seasoning by others, and we have had rather costly and unsatisfactory experiences of our own. While I may at some later date be convinced that some method of artificial seasoning of hardwood is satisfactory and economical, at present it is my conviction that the only satisfactory way to process hardwood ties is by separating them by species, thoroughly air seasoning them, holding out those that are severely split, doweling them, boring and adzing them, and then treating them with a sufficient quantity of approved preservatives.

Mr. Collister: I want to say a word or two in favor of Vapor Drying. With the low-grade swamp oak we are using, we have had a marked degree of success in using Vapor Drying for the reduction of splitting and checking in the seasoning period. With that in mind, we have been able to accept other species that otherwise we wouldn't have cared to accept or try to handle through the seasoning period. Thus we have prevented a great degree of fall-down and loss during that period.

Using Less Desirable Species

Mr. Collister: *Mr. Drew, is it economical for a railroad to use mixed hardwoods which it knows will have an expected life less than that of various other species of ties?*

Mr. Drew: This is another controversial question, and the answer is dependent on the location of the individual railroad. If the railroad is fortunate enough to have suitable species of whatever type of wood it chooses to use, there is no problem. Otherwise, it may be forced to use mixed hardwoods of less desirable species in order to take advantage of what is known as the "woods run" in the timber stands adjacent to its line. This is an advantageous approach, because it holds down the price of the tie to the user without increasing the cost to the producer to any extent. Therefore, it's good business.

We have the same thing on a national scale. We are utilizing our natural resources to their fullest extent by using these so-called mixed hardwoods of less desirable species. I, for one, feel that this should be done. However, we must not overlook the statement made by Mr. Duncan that, in using these mixed species, they should be separated if at all possible, because no two species will handle exactly the same, either in seasoning or in treatment.

Mr. Collister: Unless there are questions from the floor, this will complete our discussion.

J. D. Hudson (Virginian): *I'd like just a little more discussion on the incising of mixed hardwood ties, particularly mixed oaks.*

Mr. Kistler: I think the question of incising the oaks is more or less an individual question. In some hill oaks, in my opinion—and I am thinking particularly of red oak—there are no benefits whatsoever to incising. With some southern oaks, and swamp oaks, the greatest benefits of incising are due to the elimination of severe checking and splitting. In other words, you have more fine checks. Also, it does assist somewhat in penetration of preservative.

Mr. Burt: The question asked is probably one of the most important that we have before the industry today. It may be that, before too long, we will all come to the incising of mixed hardwoods of all species, and probably oak, but as of just now, I do not believe that we have had quite enough experience to determine the full economic worth of incising.

Of course, present indications are that incising mixed hardwoods does a lot of good with respect to reducing checking and splitting of ties during the seasoning period, but I doubt very much if we know enough now about what happens to those same ties after they are placed in track. I firmly believe that holds true with regard to oak.

Mr. Duncan: About 25 years ago, I was appointed chairman of a committee to investigate the incising of hardwood ties. I was at Delson, near Montreal, where there were two large stocks of railroad ties owned by the two large Canadian roads. One railroad incised its ties green, when received, and the other did not.

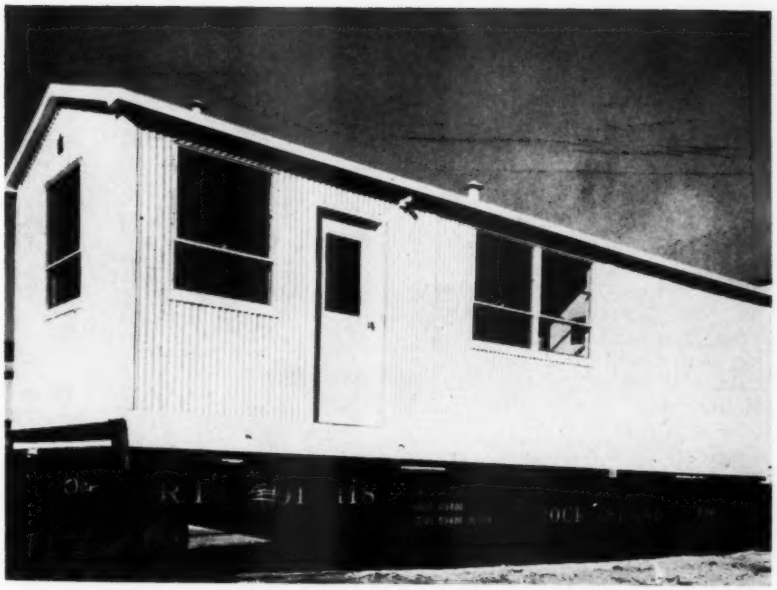
I had probably thirty fellows out looking at those ties. We spent most all day at the job, and then we tried to formulate a report. The opinion was about equally divided.

Those ties were the northern hardwoods—beech, birch and maple—and also oak. I was interested in the subject, so I undertook a test of white oak and red oak ties, incised and not incised. The ties were all hill oak. I don't remember the exact number; there were possibly 250 in the test. Half of them were incised green. After they were seasoned, they were all treated at the same time and all put in track. An equal amount of white oak and red oak were incised, seasoned and treated.

As I remember, those ties were put in track in 1935. We watched them very carefully, year after year. I couldn't see much difference developing in them, so I let them alone until late last fall. I had all the ballast removed so we could examine the ties carefully. Without looking at the number and checking the record, it was impossible for me to tell, by looking at the ties, which had been incised and which had not. Practically none of the ties had been removed.

G. M. Magee (AAR): *I'd like to know what yardstick you would use in determining when a tie should be removed from track, a tie that is otherwise sound except for tie-plate cutting.*

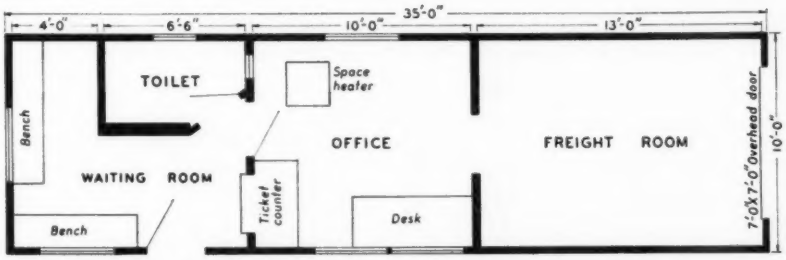
Mr. Collister: Our inspectors have seen about 450,000 ties in the last six years, both before and after they have been taken out of the track. We have found (varying with the species of wood and the conditions of track) that about 3 per cent of our ties are being removed after 24 years' service life for decay, 25 per cent for plate cut, and about 65 per cent for splits, shattering and other large checks. A very small percentage of them are coming out because of spike kill, and a small percentage because of damage due to derailments and accidents.



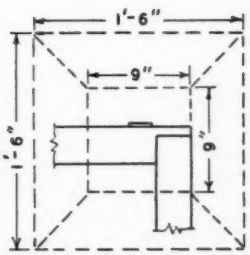
A building of standardized design, constructed as a portable unit to permit economical installation, is the Rock Island's answer to the problem of providing modern and attractive stations in the smaller communities on the road.

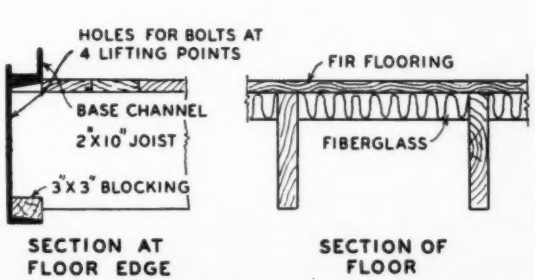
How They Are Unloaded➔

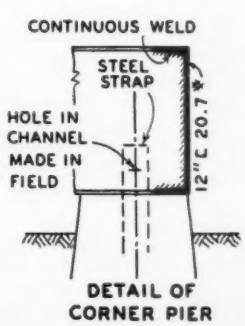
Prebuilt Depots—FOB at Plant



FLOOR PLAN may include toilet facilities (above), but if they are not provided the size of the waiting room is reduced and the over-all length of the building becomes 30 ft. Details of the floor construction (below) show how the joists are fitted to the building's welded-steel base frame. Note that holes are provided in the base channels for attaching a lifting device. Also shown is the method of insulating the floors of the office and waiting room. The building is anchored to its foundation by steel straps (below right) that are embedded in all of the concrete piers and bolted to the building's base frame. The foundation consists of eight piers similar to the one shown—one at each corner and four at intermediate points spaced equally along the sides







● Small, standardized stations, factory-built and assembled as complete units, are going into service on the Rock Island. They are the road's answer to the need for low-cost modern stations that can be easily moved elsewhere if there is no longer a need for them at the original location.

The plan was prepared through the joint efforts of T. J. Engle, engineer of buildings, and W. C. Humphreys, engineer-architect, under the direction of W. B. Throckmorton, chief engineer. The stations that have been built to date have been manufactured by the Star Manufacturing Company in its plant at Oklahoma City, Okla.

Present-day trends in rail traffic have indicated that the expense of remodeling the existing buildings at many locations is not justified nor is it feasible to maintain them in first-class shape when they were not being fully utilized. However, it was evident that some sort of building was needed for the present that would be inexpensive to erect and maintain.

Portable but Permanent

At the outset, the management of the road decided that such a building should be of a portable nature and yet present most of the qualities of a permanent structure.

This stipulation of portability was made with the thought in mind that, should it be deemed necessary to abandon the station at some future date, the building could be easily moved and relocated with a minimum of expense and thus save the cost of new construction at another location.

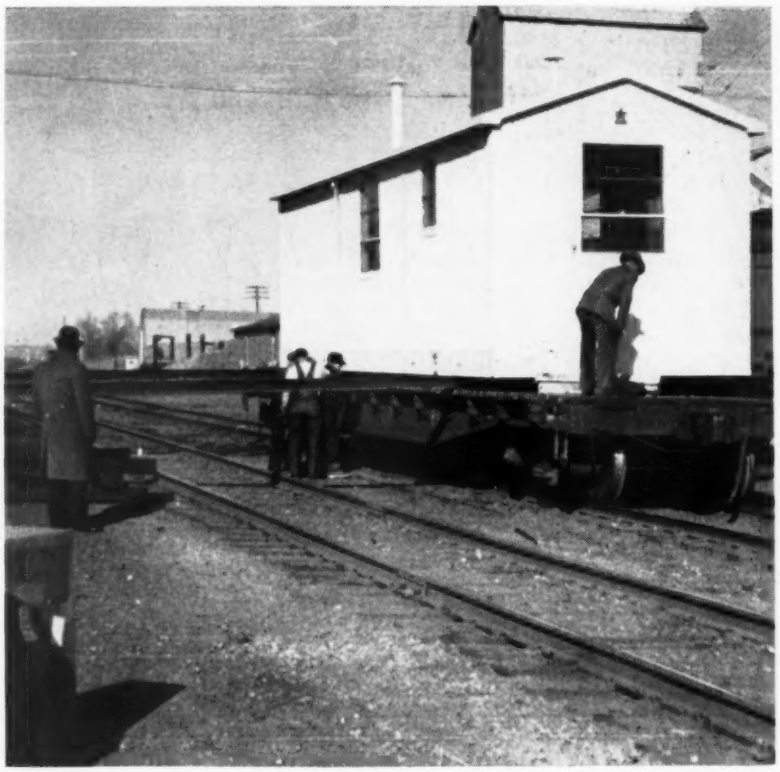
The needs of a typical small wayside station were then analyzed. The results of this analysis were given to the road's building engineers to be incorporated into a single, more or less standard, building that would be suitable for almost any wayside station location on the road. The final result is a basic structure 10 ft wide. Without a toilet, it is 30 ft long, and with a toilet the length becomes 35 ft. The floor plan of the 30-ft unit shows a 6-ft by 10-ft waiting room, a 10-ft by 10-ft office and a 10-ft by 13-ft freight and baggage room. When a toilet is installed in the waiting room the structure is lengthened 5 ft to make up for the lost space. Because of its limited width it is possible to load the building on a flat car for shipment without causing close clearance hazards.

The design calls for the building to be constructed entirely of steel with the exception of the flooring and the interior wall surfaces and trim. The flooring is laid on 2-in by 10-in joists which are securely fastened within a welded frame of steel channels. The walls of the building are approximately 4 in thick, with the exterior surface consisting of corrugated galvanized metal sheets. The interior is finished in ⅜-in fir plywood. The ceiling is constructed of flat metal sheets. The freight and baggage room walls are protected by a plywood wainscot 4 ft high. The window sash and doors are of steel construction with the exception of the overhead freighthouse service door which is of wood. To minimize the effects of extreme variations in temperature during the summer and winter months, double-faced aluminum foil insulation is provided in the walls of the waiting room and office. The ceiling and floors are insulated with Fiberglas.

Most of the permanent fixtures, such as the electrical wiring, ticket counter, telegrapher's desk and waiting room benches, are installed by the manufacturer. Before leaving the plant, the outside of each building is given two coats of cement base paint. The interior walls above the dado, and the ceilings, are given two coats of light green paint. The dado, doors, sash and trim are painted a medium green enamel. Thus, very little, if any, work remains to be done on each building when it reaches the site of installation.

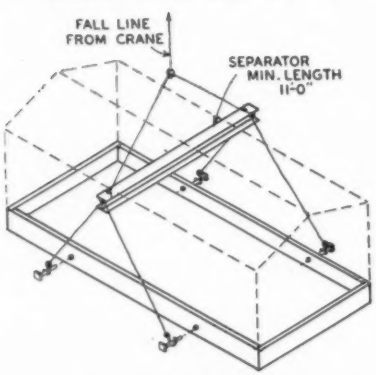
The design of the building is such that, if desired, a crane may be used to lift it to and from a flat car. To make this possible, two 1 5/16-in holes are provided in the base frame on each side. When heavy bolts are inserted into these holes, a specially designed sling, consisting of four cables and a spreader beam (see drawing), can be attached so that the unit can be handled by a single fall line. The general practice, however, has been to load and unload the buildings by other means.

Here's One Method of Unloading . . .



1 **Flat car carrying building is spotted opposite foundation which has been prepared. Rails, supported by cribbing, are placed in position and . . .**

A Crane Will Do It . . .

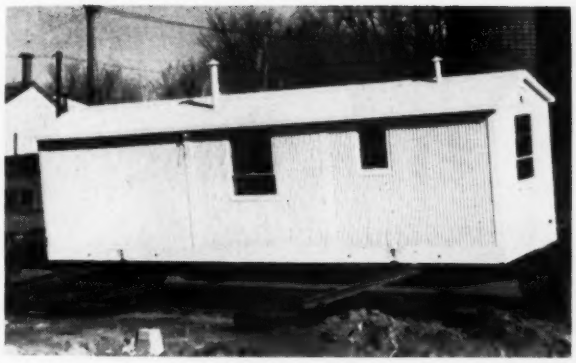


. . . By means of a sling that can be attached with bolts to the base channels.

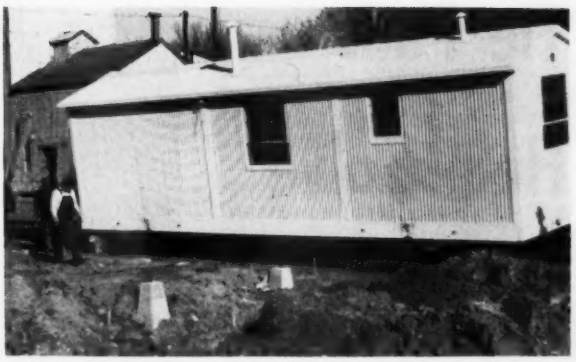
How They Are Installed

When a flat car carrying one of the buildings arrives at destination, the car is spotted directly opposite the foundation which has been previously prepared. In most of the installations made to date the buildings have been unloaded by means of skid rails, supported by timber cribbing, which are placed at the car level, permitting the building to be shifted from the car to a position directly above its foundation. It is then lowered into place with jacks. In some instances, the rails are sloped from the car to the foundation. Thus the building is very nearly in place when the shifting operation is complete.

All that remains to be done is to connect the electrical and telegraph wiring, tie into the water and sewer connections and install toilet



2 . . . Building is shifted from the car onto the rails which are placed on a slope to facilitate movement.



3 Structure is allowed to slide to the ends of the skid rails. Note foundation piers in foreground.

4 Jacks are used to raise each end of the building slightly so that the . . .

5 . . . Skid rails can be shifted forward. Building is then moved to position over piers and lowered into place.

fixtures if required, grade around the building and install the heating unit. The office and waiting room portions are usually heated by either an oil or gas 30,000-Btu space heater depending on which type of fuel is most readily available.

The Rock Island places this portable building on a series of precast concrete pedestals or piers instead of a poured concrete footing and bearing wall.

In the past year, the road has placed six of these buildings at various locations. Units equipped with toilet facilities were installed at West Branch, Iowa; Grundy Center, Iowa; White City, Kan., and Groom, Tex. One of the 10-ft by 30-ft units was placed at Chesterfield, Mo., and another at Buckeye, Iowa. A building incorporating a variation of the basic design was installed at Howe, Okla. This building is the same as the basic design except that it is 53 ft long. It serves as a joint facility with the Kansas City Southern and it was necessary to provide additional space to house interlocking equipment and for handling transfer mail and express.

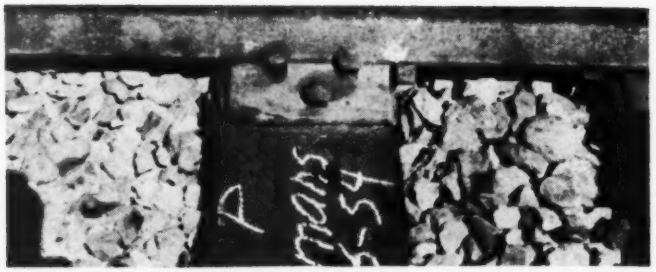
Ready For Service . . .

NEW BUILDING is in sharp contrast to the old and will serve more efficiently the needs of the small station. Old structure will be torn down.

Tie Pads Help Solve Tie Problem

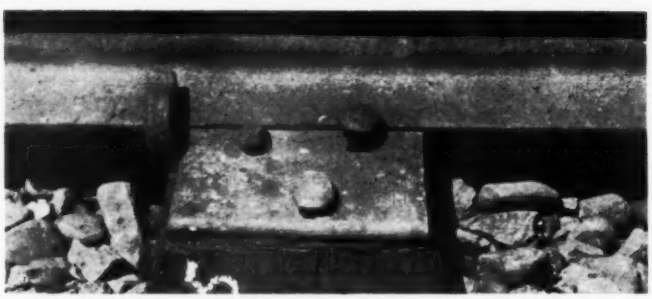
On the Western Pacific

Realizing that the full potential life of its treated crossties was not being obtained because of mechanical wear, the Western Pacific began experimenting with the use of various tie pads in 1949. Now convinced that tie pads are an economical method of prolonging the life of ties, the road has adopted the practice of using them on newly installed ties at many locations on its main tracks.



NEWLY INSTALLED ties are protected with self-sealing tie pads.

SAME TYPE of pad after several years' service in the desert.



VINYL PADS were also tested. Here's one after two years' service.

CURVED TRACK is one of the many locations where tie pads are installed. The road has many sharp curves in mountains.

● Tie pads have become a standard track material to the trackmen of the Western Pacific, as this road is now making regular use of them at many locations. This practice stems from experiments begun in 1949, which have convinced the road's management that the use of tie pads will result in substantial economies brought about by increased tie life.

The large number of tie renewals annually has been a perennial problem on the Western Pacific. This situation can be attributed to two primary considerations. One is that this road has a large number of curves ranging from 5 to 10 deg in mountainous territory. Crossties in these locations are subject to severe thrust and mechanical wear and heavy renewals have been required because of abrasion and plate cutting. Another consideration is that this road used untreated softwood ties for many years and did not adopt the practice of treating any of its ties until 1937. Beginning in that year it started treating 33 per cent of its ties, and these were installed on curves and at other locations where service was unusually severe. However, the treatment of these ties was not too effective because they were of softwood, and tie renewals continued to average about 9 per cent of the total ties in the track.

New Policies Are Adopted

This was the situation that prevailed in December 1948. At that time the management of Western Pacific gave attention to the high tie renewal rate and soon some important policy changes were placed in effect to reduce the number of tie renewals. One of these was the decision to restrict the use of untreated ties to curves of 8 deg and over and to use treated softwood ties at all other locations, beginning with the 1950 renewals. It was also decided to begin experiments immediately with the use of tie

TIE PADS eliminated plate cutting of ties on curves in Feather River canyon.

pads at locations where the full benefit of the preservative treatment was not being realized because of mechanical wear.

About 140 tie pads of each kind that were available in 1949 were installed. These were applied out-of-face, 100 of each kind on curves in mountainous territory and 40 on tangents in desert locations. The next year, also as an experiment, tie pads were placed on all treated softwood ties used for tie renewals on curves. The following year, experimental installations of tie pads were placed under railroad crossings, in turnouts, on bridges, through highway crossings, and under insulated joints. "Smears" were likewise applied experimentally. Test installations of tie pads on tangent track are also under observation.

Recent observations of these tests have convinced the Western Pacific that the tie pads result in substantial economies. Under insulated joints, for example, it is reported that the use of tie pads prolongs the life of the fibre components. On curves and through turnouts and other special locations, tie pads have eliminated plate cutting. As a result of these tests, the road adopted in 1954 the practice of using tie pads on ties installed on all curves in main track, under insulated joints, through turnouts, railroad crossings, on bridges, and through highway grade crossings, whether they occur on curves or tangent track.

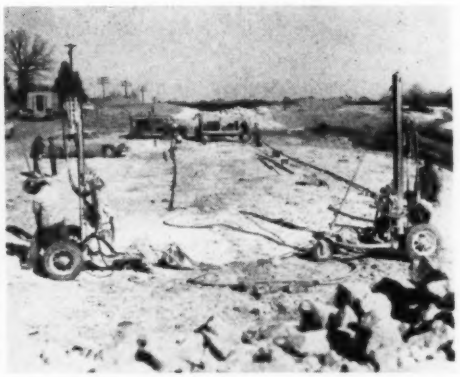
The Western Pacific has standardized on the use of a self-sealing type pad constructed of alternate layers of heavy cotton duck and woven burlap, impregnated with waterproofing saturates, laminated with thin films of asphalt, and fastened together with copper-weld stapling.

As a result of the exclusive use of treated crossties and of tie pads, the tie renewal rate has already been reduced to slightly under 5 per cent a year. The management of Western Pacific is convinced that this rate will be further reduced before long and that the average service life of ties will eventually reach 35 years or more. The road is now studying the practicability of using tie pads on tangent track, under 8-in by 11-in plates, instead of going to the larger 8-in by 13-in and 8-in by 14-in plates. This pad application will only be in areas where no major rail relay project is set up for the near future.

USE OF TIE PADS is standard practice on the WP under railroad crossings. Other standard locations are at turnouts, on curves and bridges, through highway crossings and under insulated joints.

PROPER POSITIONING is important for the correct functioning of tie pads.

(Photos courtesy Bird & Son, Inc.)



WAGON DRILLS and compressors were used to blast a cut 25 ft deep through rock in connection with a line change near St. Clair, Mo.

BLASTED ROCK is scooped up by this Lorain 2-yd crawler shovel and loaded into Dumptor trucks for disposal on embankments.

Frisco's Big Grading Fleet . . .

. . . Performs a Wide Range

THE GRADING for long spur tracks is more expeditiously handled when several units work together. Here, two Tournapulls work on a new 10-mile spur track.

With this Equipment . . .

- 1 Caterpillar D2 front-end loader
- 13 Caterpillar D4 front-end loaders
- 4 Caterpillar 933 front-end loaders
- 1 Caterpillar D6 bulldozer
- 14 Caterpillar D7 bulldozers
- 2 LeTourneau-Westinghouse D Tournapulls
- 5 Lorain dragline shovels, ¾-yd capacity
- 1 Lorain dragline shovel, 2-yd capacity
- 1 Lorain Moto-crane, ½-yd capacity
- 1 P-M Trak Kleener
- 28 Air-dump cars
- 2 Jordan spreaders
- 3 McCann spreaders
- 3 Caterpillar motor patrols
- 3 Koehring 6-yd Dumptor trucks
- 2 P-M Speed Swings
- 1 Gradall
- 30 Fordson tractor mowers
- 2 1-R wagon drills

AIR-DUMP CARS and other on-track equipment are used to fill a portion of the long bridge over the Canadian river near St. Thomas, Okla.

BULLDOZERS push loose material over the bluff to a crawler shovel that is loading a train of air-dump cars.

# of Jobs at Low Unit Costs

. . . The Frisco Is Carrying Out Many Tasks, Including:

- Industry track construction
- Siding extensions
- Line changes
- Sag raises
- Cut widening
- Tunnel work
- Bridge filling
- Dragline work
- Foundation excavation
- Trenching for installing sewer, water, air and steam lines
- Installation of subdrainage systems
- Ditching and channel changes
- Rip-rap placement
- Correcting drainage complaints and defects of various types
- Cleaning culvert outlets
- Building up road-crossing approaches
- Bank and cut-restoration work
- Installing culverts
- Handling rail from stock pile to welding production line
- Handling track and bridge materials
- Loading and unloading bulk materials
- Installing railroad crossings
- Snow handling
- Cleaning yard tracks
- Cleaning up slides and flood deposits
- Construction of roadways
- Breaking up pavements
- Refuse disposal
- Assisting at derailments

● During the past decade, the Frisco has acquired a sizeable fleet of grading equipment which not only enables the road to carry out the major portion of its maintenance grading but also much of the earthmoving work required by construction projects. And, because of the fortunate climatic conditions prevailing in Frisco territory, this equipment can be kept busy on a year 'round basis. Thus, maximum utilization is possible and full employment of the operators is assured.

The Frisco began to acquire its own grading equipment about the time of World War II when it was very difficult to get any work contracted. The first equipment purchased was principally for maintenance work, i.e., restoration work. But through its availability the road began using this equipment

Frisco's Big Grading Fleet . . .

DITCH CLEANING and deepening are perennial maintenance jobs. Here a Lorain Moto-Crane, equipped as a dragline, is improving drainage near Claremore, Okla.

for small construction projects and found that ordinarily its costs ran less when using its own equipment than when the work was done under contract. Following this procedure, the road built up its forces and equipment to the point where it now has an investment in grading equipment of approximately $925,000. The grading equipment now owned by the Frisco is shown in a table along with the types of work to which it may be assigned. No additional units are contemplated at this time and new purchases are limited to replacement units.

The tasks performed by these machines cover almost every conceivable grading operation and frequently the handling of bulk commodities such as sand and stone. They also assist in picking up material scattered at derailments. In general, the handling of AFE work is given preference over maintenance work as these jobs produce the greatest return on the investment and frequently they are more urgent because their purpose is to increase railroad business. For instance, the construction of an industry track will be given preferred attention so as to accommodate a shipper and get him into operation as quickly as possible. Between AFE projects there are plenty of maintenance grading jobs, such as bank restoration and ditch cleaning, to keep the equipment busy.

Assignment of Equipment

Unlike most roads the Frisco does not have an annual AFE budget; instead, improvement jobs are approved currently by the vice-president of operations. As soon as a project that requires grading is approved, the division engineer gets in touch with the roadway engineer, F. N. Beighley, who is in charge of the earthmoving equipment. Plans are made for the handling of any excavation, embankment or ditching work involved, and the job item is added to the equipment work-assignment list maintained currently by Mr. Beighley. In general, this work-assignment schedule is followed, but it is subject to revision as required by the urgency of any new work authorized. Hence, the roadway engineer is hard pressed at times to have the right piece of grading equipment available for the job at hand and occasionally he must use another as a substitute.

The road has both the on-track and the off-track types of equipment. For such work as cleaning out cut side ditches, shaping fills in bank-restoration work, constructing new or extending existing sidings, and for removing snow from the tracks, the on-track spreader-ditcher and air-dump cars will be employed. For other work, such as ditching, excavating and constructing embankments for yard or industry tracks, channel changes and line changes the off-track equipment will be required. The off-track equipment includes both the crawler and wheeled types so that units are available for both short and long-haul grading operations. Attachments are available for some units to increase their versatility, such as interchangeable booms to convert an excavator to a crane, dragline, clamshell or shovel unit.

An effort is made to carry out all grading work with the railroad equipment and operators. However, on jobs requiring an unusually large amount of grading, such as a current project at Demopolis, Ala., involving the construction of a track 10 miles long, it may be necessary to have a portion of the grading done under contract.

Operators Are From M/W Forces

As a rule, the operators for the grading machines are selected from the track forces, after they have first indicated a desire to become operators. These men are first trained to operate and maintain a small Fordson tractor used primarily for cutting weeds. After mastering this unit, they are instructed in the operation and maintenance of Caterpillar D2 and D4 front-end loaders. Next they progress to the D6 and D7 tractors with scrapers, the LeTourneau-Westinghouse outfits, and finally to the dragline and shovel units. A few become repair mechanics.

These men are employed all year 'round and are on monthly salaries. They are housed either in a camp bunk car or in a house trailer, the latter type being assigned to the men and their wives where normally it would be impossible for

BACKFILLING is done quickly by these two Caterpillar D4 tractors, one with a high-lift attachment and the other with cable controls.

OFF-TRACK units are converted to cranes to assist in the installation of seven lines of 108-in Multi-Plate culvert pipe.

the operators to get home on week ends. The house trailers are moved by either a panel or pick-up truck assigned to the unit. In a few instances, the operators own their house trailers.

Where the operator is housed in a trailer the grading unit is ordinarily moved on a flat car, accompanied by a tool-and-material car, and the trailer is moved over the highway. For the operators not using house trailers, special cars, which are half bunk car and half flat car (for the grading machine) are assigned. A tool and material car also accompanies each.

On projects where six or more pieces of equipment are working, a mechanic is assigned to keep the machines in running condition and make light repairs. A helper is also assigned to service the machines. When a fewer number of units work together, the operators service their own machines and make light repairs. Should heavy repairs be required, an operator will call the general supervisor of work equipment for assistance, who will send a supervisor to the scene. The supervisor will either arrange for the necessary repairs or, if the work is extensive, will recommend the shopping of the unit.

Typical Jobs—and What They Cost

Short Industry Spurs—10 Cents per Yard

For small grading jobs like this, Mr. Beighley will assign either a bulldozer and scraper or a front-end loader.

Siding Extensions—20 Cents per Yard

Two Tournapulls, a dozer-pusher and a dozer-leveler are considered to be an effective combination for this work.

Longer Spurs and Line Changes—25 Cents per Yard

For these larger jobs where earth excavation is involved, two Tournapulls, two bulldozer-scrapers, a dozer pusher, a dozer-leveler, and a motor patrol, will be assigned.

Rock Excavation—$1.50 per Yard

Where rock excavation is involved in addition to earth, equipment as assigned above will be augmented by two wagon drills, two 300-cfm air compressors, and a 2-cu yd shovel.

Bridge Filling—15 to 30 Cents per Yard

This work is handled by either off-track or on-track equipment. The off-track units used will include two bulldozer-scrapers and a front-end loader, and they are expected to fill bridges at a unit cost of about 15 cents per yard. The on-track equipment assigned to bridge filling will include a Jordan spreader and 12 air-dump cars, plus a 2-yd shovel for loading the cars, and other off-track equipment as required.

Restoration of Embankments—8 Cents per Yard

The restoration of embankments is usually handled by two bulldozer-scrapers and a front-end loader.

Apparently there are no standard signals for directing grading operations, and those that are used vary from job to job. In this article, which appeared originally in the Co-Operator, a magazine published by the LeTourneau-Westinghouse Company, the author describes a number of hand signals that have been used successfully on construction jobs.

Figure 1

Figure 2

How to Give Grading Signals

By Charles L. Ellis
Field Engineer
LeTourneau-Westinghouse Company
Peoria, Ill.

● With the grading equipment operator almost completely isolated by the noise of his machine, communication between operators and foremen on the job often takes place through hand signals.

The question has been asked many times if a standard set of signals exists. If it does, we are not aware of it. Nevertheless, many signals have been observed which seem to be successful.

It might be desirable if all of us could understand the language of the deaf mute. However, even if we could, it would be inadequate at times to fully describe an operation. Any set of signals, no matter how complete, is a poor substitute for detailed verbal instructions prior to the beginning of an operation.

The signals to be discussed have been used successfully to direct grading operations. There are undoubtedly others. This article deals primarily with motions used to direct scraper, motor grader and bulldozer operations. No attempt has been made to outline the already well-established and universally understood system of signals for crane work.

Indicating Depth of Cut

One of the most commonly observed signals that has been used in scraper operation is for depth of cut. The foreman indicates the spot where he desires an operator to drop his blade either by hand pointing, or throwing a rock or clod of dirt where the cut is to begin. Fingers are raised to indicate the depth of cut. One finger is for 1/10 ft, two fingers for 2/10's, three fingers for 3/10's and so on. To signal the information that the ultimate depth of a cut to be made in a series of passes is to be three, four or more feet, the foreman can point to his foot, and then hold up his fingers. For example, a combination of foot and two fingers would indicate that there are two more feet to grade in this area.

Figure 1 indicates that the ultimate cut to be made is 3 ft because he is holding up three fingers and pointing to his foot. Figure 2 indicates that the particular cut to be made is a few tenths, in this case three.

An operator can acknowledge he has received a signal either by a nod of the head, or by raising his hand. Waving or raising the hand seems preferable because there is less chance of misunderstanding such a signal.

Same Signals for Fill

The same system works on the fill. Fingers would normally indicate the depth of the spread in tenths; the ultimate depth of a fill of over a foot would be indicated by using the foot and fingers in combination. A signal for a 2, 3 or 4-ft fill will seldom cause any confusion since the scraper cannot dump deeper than 12 or 16 in at a time, and it is obvious that the ultimate amount of fill is being indicate. However, if the foreman does not point to his foot, it would be assumed that the particular load should be spread at a depth in tenths of a foot, as shown in Figure 2. The point at which spreading should start is indicated by pointing or throwing a rock or clod, and the operator would start dumping at the point where the stone falls. The same signals apply equally well to cut and fill work with bulldozers and motor graders.

Another common signal desirable to convey is when to drag or blade the cut, fill or haul road. This can be accomplished in a number of ways. One frequently used is to point out the area, and then rub the palms of the hands together (Figure 3) indicating a smoothing motion. It can apply not only to scrapers but to the motor grader and bulldozer operator as well.

The signal to speed up an op-

Figure 6

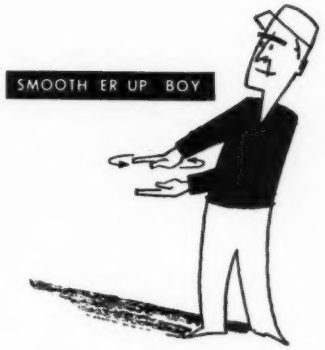


Figure 3

Figure 4

Figure 5

eration is made by vigorously indicating a circular motion (Figure 4) with the right hand. To hold up or wait can be signaled by holding up the hand with the palm facing the operator in much the same way as a traffic officer signals traffic to stop or wait.

At any point while making a cut or spread it might be desirable for the operator to alter the depth being carried. This can be indicated by simply pointing downward to cut deeper or spread in a lighter lift by lowering scraper during spread. To carry the blade higher, indicate a lifting motion (Figure 5) with the tips of the fingers.

When finished grades are approached it is often desirable for the operator to pick up his scraper and move on even though the scraper is not filled. This is indicated simply by making a lifting motion with the tips of the fingers for a lighter cut, and then following it immediately with a highball sign (Figure 6) which indicates to pick it up and go ahead. When it is desirable to have the scraper move either to the right or left, a hitch hiking motion with the thumb in the direction desired is used. A follow-through on this signal calls for a safe or satisfactory motion much the same as used in baseball when an umpire indicates that a player is "safe," when the machine has actually moved over the desired amount. Another signal frequently used when something is done satisfactorily is to make an "o" between the thumb and index finger.

A motion used by foremen to bring machines to them is simply one of motioning with one arm. However, when maneuvering in close quarters or to move a foot or two at a time, both hands (Figure 7) should be used.

To stop, both hands are raised, palms up to the operator. Clenching both fists indicates that all rolling motion of the machine should immediately stop and the brakes held. "Cutting your throat" (Figure 8) is a gesture which is universally understood. It's the signal to stop your engine.

In the case of pusher tractors, there are instances where one machine may be stuck, and it is desired to signal to an operator to push or assist the machine that is stuck. This is accomplished by banging the fist of one hand into the palm of the other, and then pointing to the machine that the tractor is to push. The same signal applies to indicate that a certain scraper is to be pushed before another, or that the tractor or bulldozer is to push a truck, another piece of machinery, a tree or boulder. When extremely slow or careful work with the tractor is desired, it can be indicated by simply rubbing the thumb against the finger tips of either hand, and then indicating the desired motion. This simply means to carry out the operation with extreme care.

When a scarifier or ripper is attached to a tractor, the foreman can point or throw a stone at an area to be ripped and convey the idea by making the ripping motion (Figure 9).

Other Signs Are Used Too

Beyond hand signals we have seen one unique trick used by a foreman where fine grading operations were being carried on. The foreman moved down the roadway ahead of the graders checking the grade with a hand level, then indicating the proper amount of cut by laying a pebble on the top of each stake to indicate 1/10-ft cut. When he wanted 2/10, he indicated this by laying two pebbles on the stake. This seemed to work fairly well up to 4/10, which in most instances covered all of the fine grade operation. In this instance, at least, the method worked successfully, and certainly speeded up the operation of fine grading.

Figure 7

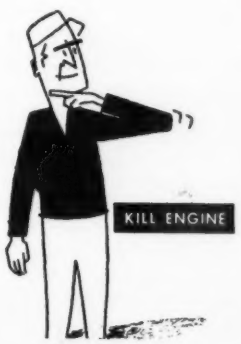
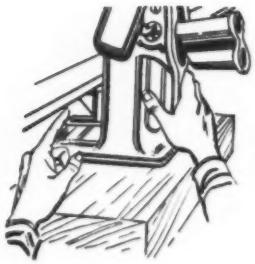


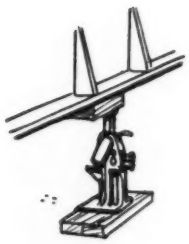
Figure 8

Figure 9

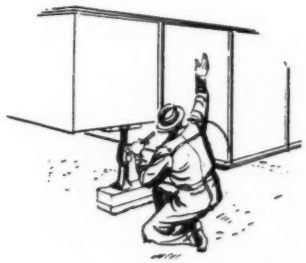


Set the lifting toe all the way under the load.

Don't allow incompetent men to handle your jacks.



When lift has been made, block the load.



Be ready to lower before setting jack in tripping position.

Be Just to Your Jacks . . .

. . . And You'll Get More Out of Them

By John J. Dixon
Chief Engineer
Duff-Norton Company,
Pittsburgh, Pa.

● Try this experiment:

Select a job that requires the use of a lifting jack. Then ask a workman to get a jack for the job.

Chances are that he'll indiscriminately pick up the nearest jack. That's because the average workman looks upon the industrial jack much as he looks upon the jack in his auto—he thinks it will do any job.

He's far from right. Like every other piece of equipment you use, jacks are built to do a special job. And certain jacks are made to perform best on specific jobs and in specific places.

The ability of a jack to operate efficiently and economically depends upon the selection of the right jack for each job. If you want a fast-working jack, for example, you would use the ratchet type, not the slower screw or hydraulic jacks. If you have to lift 30 tons, you wouldn't use a jack with a 15-ton capacity unless you want your wife to collect your insurance.

Choose the Right Jack . . .

How do you choose the right jack? It isn't as difficult to answer that question as you might think. When choosing a jack, consider these factors:

(1) *Weight of Load*—Make sure the jack is strong enough to handle the load with safety.

(2) *Type of Lowering*—Many ratchet jacks are made in either trip or ratchet lowering or a combination of both. Screw jacks are made in various types of manual or self-lowering models.

(3) *Speed of Lifting or Lowering*—Determine how fast you want the job done, then pick the right jack. Ratchet types are the fastest, but are limited to lighter loads. Screw and hydraulic jacks are more powerful but slower.

(4) *Height of Jack and Raise Required*—For general purposes, it is best to select a jack having a fairly high raise so that a variety of jobs may be handled.

(5) *Weight of Jack*—When a jack is used and moved often, select the lightest weight of the desired capacity. Many models with identical lifting power are made with either malleable iron or aluminum housings.

(6) *Constant Service*—If the jack is in constant use, consider all these features—speed of lifting and lowering, ease of operation, ease of handling, long life and protection against wear, ease of maintenance and repair.

(7) *For Close Quarters*—The best jack for working in a narrow space is a small head jack. This type can be spotted squarely under the load and prevents undue strain on the jack mechanism. Where there is plenty of room, the large jack head provides ample area to grip the load.

(8) *Use of Foot Lift*—Most ratchet and many screw jacks are equipped with foot lifts, a handy feature for getting a "toe hold" close to the ground.

(9) *Jack Cost*—When two or more types of jacks fulfill the requirements, price may become a determining factor. Naturally you will choose the least expensive, but always keep in mind quality, maintenance, ease of handling and serviceability.

. . . and Take Good Care of It

Having chosen the right jacks, the next thing to keep in mind is taking care of them so they will give you good performance for a long time to come.

Keep your jacks handy. Designate a spot where jacks are to be stored when not in use. If they are not readily located, it may seem easier to the worker to use his own muscles instead of getting a jack. What happens to his muscles can be related to you by any of your company doctors. Let jacks be your mechanical muscles for lifting, lowering, pushing or pulling.

Don't use defective or unsuitable jacks or jack handles. Check your jacks and jack handles before using to make sure they are in good condition.

Don't allow incompetent men to handle your jacks. This will avoid injury to them and other men and equipment.

In case of doubt, use a jack of greater capacity. If the load is greater than the jack's rated capacity, use a stronger jack. When using the foot lift, for safest and easiest operation figure on its capacity as one-half the rated capacity of the jack. This is due to the fact that such loads are car-

In case of doubt use larger jack.

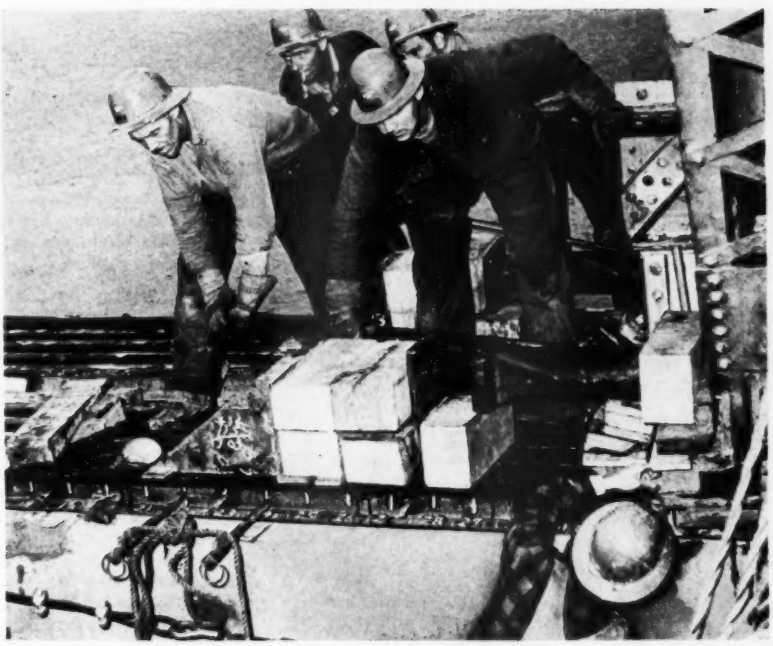
Let jacks be your mechanical muscles.

Be sure jacks are properly blocked.

Remove jack handle from socket after lift.

If your jack is broken, don't discard it.

CENTERED and plumb, this jack will not slip and drop load under pressure.



SOLID BLOCKING of these jacks used to line up bridge provided maximum safety with minimum of effort. Always block as closely as possible to the load.

ried eccentrically and are not centered as are head loads.

If the jack has been overloaded or strained, don't use it until inspected. Repair it if it is damaged. Check your jack before using it.

Set the lifting toe all the way under the load. When using the foot lift, make sure the lifting toe is firmly and squarely placed as far as possible under the load so that, when pressure is applied, the jack will not slip out and drop the load. During the raising operation, be especially careful to watch the load to see that it does not work too far out on the toe.

Make sure jacks are centered, plumbed and properly blocked. And don't set your jacks on yielding bottoms. If the surface is soft or uneven, block up the jack bottom. Also make sure the head of the jack is against a solid part of the load so that movement will not cause the load to slide or rock. To get maximum lift in your jack, always block as closely as possible to your load.

Be Sure to Block Load

When the lift has been made, block the load. This prevents sudden dropping of the load if the jack is jarred. Never leave a load on a jack without blocking.

Remove the jack handle from the socket after the lift is made. This eliminates tripping over the handle and moving the load while being held on the jack.

Make sure you are ready to lower before setting the jack in tripping or lowering position. Leave the jack set for lifting at all times. Then if the socket lever is moved the jack will raise, not drop the load. Check to see that all tools, equipment, hands and feet are clear before lowering the jack.

When finished using a jack, set it on its side or put it back in the stock room. If you leave the jack standing, someone's liable to trip over it.

If your jack is broken, don't discard it. Check with a representative of the manufacturer. A new part might save it.

Clean, grease and oil your jacks regularly. Remove cover plates to make sure rust and dirt are not clogging inner working parts and that they are properly cleaned and greased. Oil jacks at least once a month, filling all oilers and oiling all moving parts—the ratchet case, key way, standard. Use only low, cold-test oil and grease.

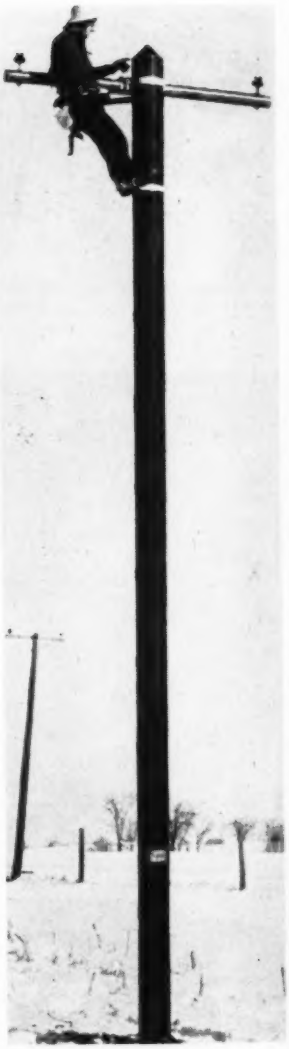
Keep a sufficient supply of jacks for your needs. Make sure the jacks are suited for your particular type of operations. Indiscriminate buying of jacks is wasted money.

ATTRACTIVENESS was of primary consideration in designing this new Armco Steelox freight house on the Detroit, Toledo & Ironton at Washington Court House, Ohio. Main entrance has a glass door with side lights and a fixed transom. Walls of the general and private offices are of natural finished knotty pine.

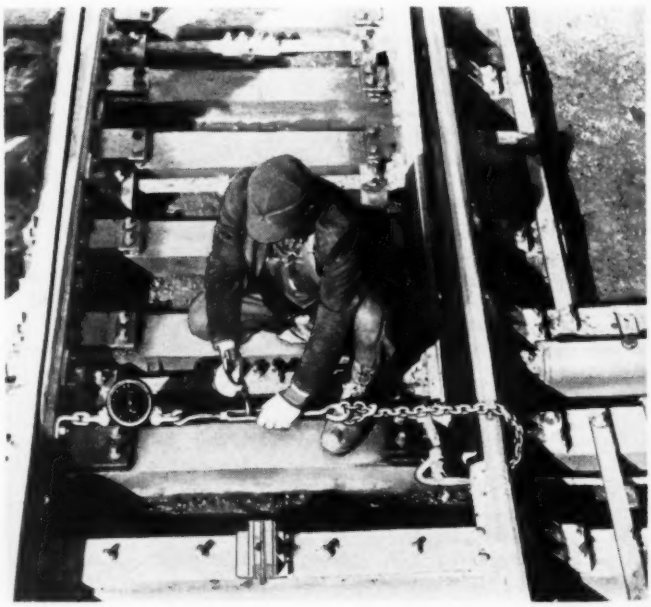
News Briefs in Pictures . . .

HIGH-SPEED test track at Holloman Air Development Center of the U. S. Air Force carries a rocket-propelled sled at 632 mph. The track is constructed of 115-lb AREA rail supplied by Colorado Fuel & Iron Corp. The rails are laid on reinforced concrete beams and secured laterally at 9-ft intervals by concrete ties. Sliding runners on sled grip rail heads.

SPRING-SWITCH operating pressure is tested by a dynamometer (right) manufactured by W. C. Dillon & Co., Inc. The device is attached to the closed point and load is applied with a turnbuckle until point opens. Reading obtained is checked against normal pressure and adjusted.



FIBER GLASS poles and crossarms (right), said to be immune to the effects of the elements, can be installed with ease by two linemen. Manufactured by Gar-Wood Industries, each pole is a tube 35 ft long and 11 in. in diameter, and weighs 150 lb, about one-fourth that of a wood pole.



WHAT'S THE ANSWER? . . .

. . . a forum on track, bridge, building and water service problems

Installing Anti-creepers on New Rail

When new rail is to be surfaced immediately after it has been installed, should the anti-creepers be installed by the rail gang or the surfacing gang? Why?

The Duty of the Rail Gang

By L. B. Cann, Jr.

Division Engineer, Richmond, Fredericksburg & Potomac, Richmond, Va.

In applying this question to modern-day track work, it is essentially the duty of the rail gang to install anti-creepers or rail anchors at the time that new or secondhand rail is laid. This is necessary because "rail creepage" or "running" has to be prevented prior to the movement of the first train. Anchors are designed to resist or check the longitudinal motion of the rails under traffic and to maintain the desired joint gap which was regulated during laying. For this reason anchors, regardless of type, should be installed as part of the rail-laying operation and should fully protect the rail before trains are allowed to operate over the track.

To deviate a little from this question, most roads today require a surfacing gang to tamp the track and to put the final surface on the rail immediately after new rail installation. If this practice is not followed the structure of the rail may be damaged and the life of the rail shortened. The mechanical tamping machines used today oftentimes strike ties and disturb the bearing of rail anchors installed by the rail gang. It then becomes the duty of the surfacing gang to readjust all anchors not in their proper position. This is a very important feature of good track maintenance.

Continuous-welded rail has been a big factor in bringing the attention of everyone to the value of rail anchors and the proper time of installation. The decision to apply them by the rail gang during the rail laying is imperative. They must be applied at this time to resist the tremendous compression and tension stresses built up in continuous-welded rail as a result of temperature changes during a 24-hr period. If this is not done the slightest rail creepage in the rail will result in poor line, gage and surface. The American Railway Engineering Association's recommendations for quantity and position of rail anchors on welded rail have proved satisfactory and are being used by more roads as this type of rail installation increases.

In conclusion, bearing in mind that all conditions are not the same, experience has shown railroad maintenance men that rail anchors are needed and that they should be installed by the rail gangs at the time of rail installation and readjusted by the surfacing gang.

Install Anchors When Laying

By L. H. Bond

Assistant Engineer, Illinois Central, Chicago

My answer to this question is this: "No traffic should be allowed on new rail before the anti-creepers are installed."

In practically all cases this means that the rail gang will have to install the anti-creepers and the surfacing gang will have to adjust a certain number of them while surfacing. This added expense is fully justified as it is most important that no traffic be allowed on new rail before it is fully anchored.

Place Anchors Immediately

By L. J. Gilmore

General Roadmaster, Great Northern, Spokane, Wash.

It is extremely important to apply the anti-creepers immediately to new rail as it is laid. The reason for this is to control and

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Answers to the following questions are solicited from readers. They should be addressed to the What's the Answer editor, Railway Track and Structures, 79 W. Monroe St., Chicago 3, and reach him at least five (5) weeks in advance of the publication date (the first of the month) of the issue in which they are to appear. An honorarium will be given for each published answer on the basis of its substance and length. Answers will appear with or without the name and title of the author, as may be requested. The editor will also welcome any qustions which you may wish to have discussed.

To Be Answered In the August Issue

1. Can the necessity of spot tamping track be eliminated without detrimental effects? What conditions must be established and what methods of maintenance are required to make this possible? Explain.

2. What are the most effective methods of preventing termite infestation of buildings? How can such infestation be detected? What methods can be employed to get rid of termites once a building is infested?

3. When widening embankments, what methods should be employed or precautions taken to insure that the added material will bond with that of the existing slope? What, if any, conditions require special treatment? Explain.

4. What is the value of records of foundation-pile penetration and resistance? How should the data be recorded? What factors, if any, are important in such records? Explain.

5. What are the advantages of maintaining a uniform ballast toe line? Disadvantages? Are the advantages sufficient to warrant the expense? How best can such a line be established and maintained? Does the type of ballast affect the method used?

6. To what extent is it practicable or economical to provide facilities for the reconditioning of lubricating oil used in diesel engines? What is the minimum facility necessary for the reclamation of such oil? Explain.

equalize the allowed expansion throughout the relaid territory. If the anchors are not applied expansion will not be controlled. If the rail is to be surfaced immediately after it is installed, the anchors should be taken off and reapplied as the ties are respaced and the track is surfaced.

However, a much better way is to give the track an initial lift prior to relaying the rail to correct irregularities in grade line, provide uniform tie spacing and correct alinement of the track. If this is done the new rail will lay better and the anchors can be permanently applied at the time of the relaying. Later, when the track is surfaced with new ballast the expansion will remain uniform.

Minimum Width of Pipe-Line Trenches

What is the minimum width required for pipe-line trenches? Most economical width? What effect does the diameter of the pipe of the depth of the trench have on this width? Explain.

No Rule of Thumb

By W. E. CHAPMAN

Superintendent Maintenance, Central of Georgia, Savannah, Ga.

There is no rule of thumb that will give the minimum required width of pipe-line trenches. There are a multitude of factors that have to be considered and evaluated carefully. These factors include types of soil, weather, water in the soil, labor efficiency, topography, standards of design, construction practice and the use of the pipe. The latter factor often determines the working room required by men installing the pipe.

The most economical width will be determined by the same factors. Where one type of soil would only require, at shallow depth, a trench as wide as one outside diameter plus 6 in, another type of soil would require sloping of sides to prevent cave-ins or even sheeting of the trench. The question of cost of sloping sides of trenches at prevailing wage rates, compared with driving sheetpiling or of constructing other types of retaining facilities, then enters.

Other factors involved in determining the necessary and most economical width are the necessity for de-watering and the type of bed needed for the pipe. The bed required may vary from tamped soil to rock or other foundations, such as piling, cradles, etc.

The diameter of the pipe and the depth of the trench have a tremendous effect on the width of the trench. You must have a trench at least equal in width to the outside diameter of the pipe plus working room for proper installation of the pipe. The depth of trench multiplies the problems presented by unstable wet soils, de-watering and the preparation of proper beds or other foundations needed.

Another important factor is the diameter, length and kind of pipe to be installed, and whether the pipe can be joined on the surface prior to laying in the trench. Naturally, pipe of small diameter, of long lengths and light weight, can be installed in a narrower trench, particularly if the pipe can be joined on the surface before lowering into the trench.

Heavy, short-length, large-diameter pipe will need to be laid by joints and the trench must be wide enough to permit men to work joining the pipe. The width of trench will further be governed by the tools needed to join the pipe.

Therefore, pretesting of some soils is necessary and all other factors must be considered in order to determine proper width.

Five Factors Affect

By L. P. DREW

Assistant Chief Engineer, Union Pacific, Omaha, Nebr.

The minimum width required for pipe-line trenches is governed by several factors, such as:

(1) Diameter of the pipe.
(2) Type of joints.
(3) Depth of trench.
(4) Character of material through which trench is dug.
(5) Method of excavating trench, whether hand or machine.

For small-diameter pipe with screw joints a trench of minimum width will prove most economical. However, for bell-and-spigot joints, or other types of couplings that must be made up in the trench, sufficient width must be provided for making up joints.

For all types of pipe that can be coupled-up above ground and then laid in shallow trenches complete, the minimum width of trench will be governed by the space required for workmen. Usually shallow trenches 12 in to 18 in. in width are sufficient with a width of 24 in required for trenches up to 5 ft in depth.

If soil conditions are such that shoring or sheathing is required, extra width must be provided to permit installation and removal of shoring.

In stable types of soil where pipe lines of flexible materials are laid that can be assembled above ground, there are "jeep" type trenching machines that will cut trenches a few inches in width. This type of trenching requires handling of a minimum amount of dirt both in excavation and backfill.

Use 18-In Minimum

By H. M. DICK

Supervisor of Structures, Philadelphia Region, Pennsylvania, Harrisburg, Pa.

The minimum width required for pipe-line trenches is determined by the character of the soil, size of pipe and type of joint to be used. The minimum width of any pipe-line trench should not be less than 18 in. Excavation and the ability to properly backfill determines this 18-in width.

Adherence to the following trench-width sizes for pipes mentioned would be the most economical.

Pipe Size (Inches)	Trench Width (Inches)
4	18
6	20
8	22
10	24
12	26
16	30
18	34
24	40

As the diameter of the pipe increases it will be necessary to increase the width of the trench. When the trench is excavated to a depth which makes it necessary to shore, the width will again be a factor. This is necessary in order to allow space to place the shoring.

Surfacing at Highway Grade Crossings

What is the best method of surfacing track through a highway grade crossing where it is not possible to raise the track grade? Explain.

Drainage of Utmost Importance

By C. E. Neal

Division Engineer, Northwestern Pacific, San Rafael, Cal.

The problem posed by this question cannot be intelligently answered unless all factors which affect the track structure are known. For instance, one should know the class of track involved—whether main line, branch, or siding—speed of trains operating over the crossing; type and kind of ballast, rail, and ties in the track structure; and, last but not least, the kind and weight of vehicular traffic using the crossing and the speed at which it is operated.

If the rail, fittings, ties and ballast are in good condition and subgrade is not muddy and does not require draining, then the problem becomes one of removing the pavement or crossing material, raising the track to the established grade, air tamping the ties (or tamping with a good mechanical tamper), then filling the cribs with clean ballast, and making a temporary crossing by using timber or pavement. The temporary crossing should be used for a week or so until the track is well traffic-tamped, after which any spot that needs to be tamped the second time can be corrected before the final paving is done.

Drainage is of the utmost importance in any crossing, and before any major overhaul job is undertaken a plan should be devised to drain the subgrade by use of perforated pipes, French drains or other approved method. A real study of the water problem should be made so that the best possible drainage system at the most economical cost can be provided. Very often the introduction of grout into the roadbed will stabilize the subgrade and make it possible to better maintain road crossings. In some instances it has been found that track can be brought up to grade by forcing the grout into the subgrade but the results are usually not permanent.

Centerbound track through-crossings can cause much difficulty and can result in very unsatisfactory track conditions. This condition must be watched and steps taken to avoid center binding by seeing that the roadbed is not tamped solidly for 6 in each side of the track center line. In many cases it may be necessary to lower the track through the crossing and then resurface on clean crushed rock to avoid having centerbound track conditions.

The biggest cost in road-crossing work is always the opening up and closing of the crossings. Therefore, whenever it becomes necessary to work in a crossing the best possible job should be done. This includes using the heaviest rail available, seeing that only the best ties are put through the crossing, that good clean ballast is returned to the track and that the track is well surfaced and tamped. A little extra time spent in thought and preparation will pay off by producing crossings which will stand up longer under highway and railroad traffic.

Hold Raise to Minimum

By J. L. Dell

Track Supervisor, Baltimore & Ohio, Garrett, Ind.

When a track requires resurfacing through a highway crossing the top of rail will usually be from one-half to three-quarters of an inch below the original grade of the highway. In such cases at least an inch of raise can be made before a sensible highway official will consider it a grade change.

Unless the ballast is badly fouled and there is inadequate drainage an inch of raise is sufficient to provide good riding qualities to the track. In fact, the track raise should always be held to a minimum through highway crossings. Highway commissioners must protect riding conditions of the highway and it is only reasonable that the highway will suffer if we make high and frequent track raises.

If ballast is fouled and there is no drainage from a crossing, no amount of track raise will give lasting benefit to the track. At such locations the fouled ballast must be removed and proper drainage provided. If desired, the old ballast may be removed to a depth that will permit installation of a substantial section of new ballast.

Removing the old ballast is a costly and tedious process. If traffic and equipment permits, the cost can be greatly reduced by removing rails and crossties and removing the old ballast with a clam shell.

It is advantageous to allow machine surfacing gangs to skip over the highway crossings and resurface track through the crossings with smaller gangs, using pneumatic tampers.

Crib Out Old Ballast

By W. H. Colson

General Roadmaster, Atlantic Coast Line, Rocky Mount, N. C.

This is a question which touches on a problem that has repeatedly received the attention of every track supervisor. My experience has been that, in maintaining a grade crossing, it is necessary to keep the crossing as well-drained as possible.

When it is necessary to surface a grade crossing, where it is not possible to raise the track grade, the old ballast should be cribbed out, and the track under-cut and track lowered in order to get at least 10 to 12 in of clean ballast through the crossing area. This will keep the crossing drained for several years. Any ties not good for several years wear should be removed from the grade crossing and, if found to be usable, installed in a sidetrack where their remaining life can be utilized.

After the ballast through the crossing area is forked under, the track should be allowed to settle under traffic for three or four days. The track should then be pulled back up to grade and back tamped with air tampers. While the crossing is settling under traffic, temporary crossing boards should be used. After the crossing has settled, these boards are removed and permanent flange boards are placed on each side of the rails at a distance of 2¾ in from each rail. The crossing area should then be filled in with rock ballast to within about 3 in of the surface of the flange boards.

The crossing is then paved to the surface of the boards with a bituminous material. This material must be packed tightly in the flangeways to prevent water getting into the ballast area of the crossing. The fouling of the ballast

is thereby eliminated for several years.

Where a roller is not available to pack the bituminous material, it will be necessary to place additional bituminous material in a short time due to settlement of the bituminous surface.

Remove Foul Ballast

By N. J. Vito

Roadmaster, Delaware, Lackawanna & Western, Buffalo, N. Y.

In my opinion there are few if any crossings where a one-inch raise could not be made without changing the track grade. This is due to the settlement in the crossing area from compaction and disintegration of the ballast.

Crossing standards are different on many railroads—some use full planking, some full Amiesite, some partial planking and some have a few grated crossings. Whatever the standard, cribbing of the foul ballast in the crossing is necessary.

In the cribbing operation on our railroad, we have been using a cribbing fork for many years past. This fork has two prongs of tempered steel about 12 in long and is used to break up compacted material. It is made to fit on a standard tamping gun. This tool eliminates 90 per cent of hand picking.

Several years ago we started using a Fordson tractor that has a hydraulic front-end loading bucket and a hydraulic backhoe attachment. The backhoe attachment has two sizes of buckets. One of these has a 20-in mouth and the other a 9-in mouth. They interchange easily. The larger bucket is used to remove the top covering and the small one to break up and remove the crib material. The small bucket is also used to ditch parallel to both rails at the ends of ties.

After the crossing has been thoroughly cribbed, fresh ballast is hauled in with a dump truck to save time and handling. After the stone has been leveled the track is given a surface comparable to the size of ballast used, giving the track a new cushion, surface and alinement. Tie cribs are then filled and the top covering is applied.

Crossing maintenance is expensive and it is imperative that a thorough job be done. Such a job gives the crossing the same life span as the open track on both sides of it. This makes it unnecessary to do further maintenance before the next cycle is due at this location. To obtain this condition, the crossing must be cribbed free of all foul ballast. In the cribbing operation the foul and compacted ballast should be removed in the tie crib to a depth of several inches below the bottom of the tie. A ditch at the tie ends, parallel to the rails and extending the full length of crossing, should be opened up at least 10 in wide or more and should be dug several inches deeper than the tie cribs to allow for drainage. Care should be taken to be sure every tie end is exposed.

This method of crossing maintenance has reduced our maintenance costs, but more so, it has increased our production so that we are capable of staying ahead of our mechanized track-raising gangs. Today this is important.

Backfill Drainage for Masonry Culverts

Under what circumstances are pipe drains required in the backfill adjacent to the sidewalls of masonry culverts. How may they best be installed? Explain.

Provide a Positive Drain

By W. T. Adams

Specification Engineer, Armco Drainage & Metal Products, Inc., Middletown, Ohio

Pipe drains should be used in the backfill next to masonry culverts when ground water appears on the adjacent slopes or when surface water accumulates in the backfill. Regardless of the source, water in the backfill may cause excessive loads on the structure, induce movements in the fill that can result in a soft surface, hasten deterioration of the masonry, and cause trouble during freezing conditions.

The water may work down from the roadbed or from the top of decked structures. Ground water is often present and just as often overlooked. Well-defined water-bearing zones or seeps are easy to recognize, but a change from a pervious upper layer to a relatively impervious lower layer may indicate wet-weather seeps that should be drained. Adequate drainage should be installed for all these conditions.

The drainage system must be designed to provide a positive drain for all water entering the backfill. It should also pick up the water before it can enter and saturate the fill. The system must include a granular fill or filter to separate the water from the soil, a pipe to take water from the filter, and a positive free all-weather outlet for the water.

Size of the pipe and the extent of the drainage system is largely a function of the size of the structure. Generally, the pipe should be installed horizontally near the bottom of the excavation at the lowest elevation that will give a free outlet. In built-up areas, storm sewers may provide the best outlet. The pipe must be covered with a granular filter properly graded to permit the water to filter out of the soil and prevent the fine backfill material from entering the pipe. Concrete sand or bank-run sand of similar gradation is excellent filter material for most conditions. It will keep the soil fines out of the system and can be placed directly around perforated corrugated metal pipe with no danger of the filter working into the pipe. With other types of drain pipes it will generally be necessary to use two grades of filter material—a coarse-graded filter around the pipe and a fine-graded filter between the coarse filter and the backfill soil. The filter must be continuous from the pipe to the seepage zones.

The most effective way to pick up groundwater seepage is to blanket the cut slope parallel to the structure with a layer of filter material. This method intercepts the water before it can get into the backfill. Where there is a large volume of water in a well-defined area, installation of an intercepting drain separated from the culvert or bridge structure may be indicated. In many cases, a layer of filter material should be placed against the entire vertical surface of the masonry. With large structures, and especially when water may collect on the top, vertical risers are built into the system. Frequently, additional horizontal pipe lines will be required. Positive and tight fitting joints should be used

to connect the different lines of the pipe system.

Installation of the pipe and filter drainage system should be done when the culvert is built. A good inspector or engineer will have his eyes open to spot possible seepage zones and provide the necessary drains. The pipe must be placed on a firm foundation with enough grade to cause the water to flow to its free outlet. The filter material must be carefully placed around the pipe and extend up through any possible seepage zones. The pipe can outlet through the masonry wall or it may have a separate outlet beyond the end of the wing walls. While with modern boring machinery it is possible to install a pipe after the structure and fill are completed, this rarely results in a satisfactory drain. The method should be used only for maintenance. The pipe needs a properly graded filter around it to make a satisfactory well-drained system.

Weep holes through the masonry backed up with granular fill on the earth side of the structure have been used, but they often fail to function properly because the holes become plugged or there is settlement of the fill. A well-designed drainage system with properly graded filter and perforated corrugated metal pipe to provide a positive drain opening will easily justify the expense in lowered maintenance costs of both the track and the drainage structure.

Plating Branch-Line Ties

There are frequent branch-line locations where the ties are not fully tie plated. During out-of-face tie-renewal operations, to what extent should unplated ties, not removed and replaced, be plated? If all ties should be plated at this time, what is the best method of doing this work? Explain.

Install Extra Plates First

By James R. Carden, Sr.
Track Foreman, Southern Pacific,
Elko, Nev.

Where tie renewals are heavy and out-of-face tie renewals are necessary to restore tie conditions on branch lines, it is my opinion ties should be plated in advance of out-of-face renewals.

Ties are often worn considerably but have good wood and good bearing. These ties, where cut, will have to be adzed to properly seat the tie plates. Hand adzing is not only a waste of labor but is never uniform and should be avoided if possible where out-of-face work is to be considered.

Hand adzing of ties can be avoided by operating a gang consisting of 46 men with a limited amount of track machinery in advance of out-of-face tie renewal operations. Such an operation will result in more uniform gage and better seating of plates and rail.

The following machinery will be adequate to do the job and a train crew will not be necessary: 1 off-track air compressor to operate air hammers for driving spikes; 1 adzing machine; 1 spike puller; 1 ballast cribber; and 1 creosote tie sprayer. All this machinery can be very easily removed from track in a limited time by using a couple of 3-in by 12-in by 12-ft timbers. No bolting machines are required as the rail is never broken at the joints. Spikes are pulled one rail back from the starting point and rail is pushed to center of track to clear the ballast cribber and adzing machine.

Plate All Treated Ties

By Ira W. Toy
Roadmaster, Minneapolis, St. Paul &
Sault St. Marie, Drake, N. D.

There is much that must be taken into consideration when answering these questions. First, all untreated soft-wood ties are not worth the time spent plating. Second, all treated ties are worth plating as plates add many years of life to a tie. A plated tie also holds gage much better with less wear on the spikes.

I find the best way is to distribute my plates to the ties that are to be plated. This includes both the ties that are to remain in track and the ones that are to be renewed. I then organize my men in this way; one man pulling spikes on ties that are to remain in track and are to be plated; two men plugging the holes, driving the plugs down and adzing off the remains of the plug; one man, with a jack, placing the plates; two men with a gage spiking up; and two men with a trowel and jack. Each unplated tie that stays in the track receives a ½-in shot of gravel from the trowel to give the tie bearing against the rail.

After the men have covered enough ground to take care of tie renewals for the remainder of the day, they should back up and start installing ties that are to be renewed. The location where work is being carried out should be covered with a slow order and protected by flags.

Old Ties Not Plated

By G. S. Fraser
Section Foreman, Canadian Pacific,
Fulda, Sask.

The Canadian Pacific has not renewed ties out-of-face and installed tie plates on the remaining unplated ties in one operation on branch lines where traffic is light. There are many branch lines which are not fully plated and which will remain that way for a few years. This is because the section gangs look after all tie renewals and only apply plates to the new ties installed each year.

Hundreds of miles of new branch lines were constructed during the 1920's. Untreated ties were used throughout and, with one exception, tie plates were not installed. On many of these lines heavy work-train traffic, at the time of construction, has not been exceeded to this day.

A few years after the branch lines were taken over by the operating department, the curves were given a small raise and tie plates were installed on every third tie. Most of these curves were less than 4 deg and the speed limit very seldom exceeded 30 mph thus very little trouble was experienced.

The first treated ties for renewals on branch lines were supplied in 1937 to a few of the more important lines. By 1943 treated ties were distributed to all branch lines together with tie plates for new ties being installed. As tie renewals were heavy for a few years the

curves were soon fully plated and numerous plates began to appear on the tangents.

Regular section gangs augmented by a few extra men dug in the ties and applied the plates. A certain amount of "spot" surfacing was done as the gang went along but "out-of-face" work was not attempted as section gangs of five or six men could not handle the extra work. On many sections tie renewals reached the 6000 figure and the program was always completed by fall so this method of renewal proved very satisfactory.

The ties were usually unloaded by the section gangs in the fall and then spotted along the grass line for the winter months. Six cars were worked at one time. The men in each car unloaded two ties to a pole length which just about filled the order at that time. The tie plates were unloaded and stacked in the various yards at a good location when they arrived on the subdivision. A push-car load, taken out on the job, in the morning would keep the gang going all day.

This is just a brief outline of how we handled our branch-line tie problem on the Canadian Pacific. Where branch-line traffic is heavier a quicker method is probably required.

Records of Repairs to Buildings

Should reports be kept of the repairs made to individual buildings? In what detail? Who should be responsible for them? For what purpose can they be used? Explain.

Three Categories of Repairs

By A. B. Fowler

Superintendent of Construction, Erie, Cleveland, Ohio

This subject falls under three general categories:

(1) Ordinary repairs in general made substantially in kind, in which strength or design is not involved.

(2) Changes in original design where structural members are involved.

(3) Emergency repairs where time does not permit proper details to be developed and in which standard practices are usually followed to a large degree.

Under item No. 1, detailed records, except of the year in which the work was carried out, are of little value and the additional expense of such records is not warranted.

Under normal conditions, repairs carried out under item No. 2 have been studied and plans developed detailing the work to be done. Where this has not been possible the field forces should keep accurate data on such repairs. In either case complete field records should be on file for future reference. This is especially so where structural-steel members are involved.

Repairs in the nature of item No. 3 are usually followed by permanent replacements. In this case complete records of emergency work are of great value in both design and construction when the permanent work is being planned. Quite often, either part or all of the emergency work is left in place for an indefinite period of time after studies of its stability have been made.

In conclusion, I would state that records are not necessary for item No. 1. For items No. 2 and No. 3, permanent records are of considerable value and should be kept. In general the responsibility for keeping these records should be under the department carrying out the work.

Record Keeping Imperative

By B. J. Ornburn

Assistant Chief Engineer—Structures, Chicago, Milwaukee, St. Paul & Pacific, Chicago

It seems to me it is imperative that detail records be kept of repairs made to individual buildings. This is necessary in order that a satisfactory system of selecting and placing materials can be adopted for all building maintenance work.

A record of repairs to individual buildings is very important to the maintenance supervisor as it will give him a record of the work done in the past and will be a guide for him in planning future work. It will also help him to develop the best and most economical maintenance practices.

Since there are many types of buildings and uses for buildings on a railroad, I would say that generally we would want a record of all major repairs, such as repairs to foundations and footings, major repairs to exterior surfaces, renewal or repairs to roofs and painting. On interiors, we should have a record of cleaning or painting, plumbing and electrical repairs and any extensive repairs to floors, walls or ceilings.

These repair records should identify, whenever possible by manufacturer's name, with an adequate description and definitely establish what material was used. This will work toward the adoption of the most suitable materials and the elimination of unsatisfactory materials. The repair record will, also, tend to identify any improper labor practices and permit the supervisor to improve this phase of the maintenance picture.

All building-repair records should be originated by the men who do the work. The type of organization required to accumulate the information is not too important, as long as it is made available to the field supervisors as well as the general offices. Presumably, the field supervisors would be responsible for the accuracy and dependability of the reports. The general office or district office would have overall supervision to see that the best possible use is made of the information developed.

It is impossible for any person to remember all the details of every job he has done or supervised. The use of building-repair records in sufficient detail to identify good materials and good workmanship, as well as poor materials and poor workmanship, will ultimately result in eliminating unsatisfactory conditions. Better and more economical maintenance is the result.

Expense Is Not Justified

By B. H. Crosland

Chief Engineer Maintenance of Way, St. Louis-San Francisco, Springfield, Mo.

From time to time we have given considerable thought to this question but, in each case, have come to the conclusion that the expense of keeping such records would not be justified. Briefly, the reasons for this decision are that we feel that

the only value of such records would be to determine when annual maintenance cost reached the point where the structure should be completely replaced.

On that basis, it is felt that the same mission could be accomplished better and more economically by examining each case as it arose, where repairs were indicated, to determine whether necessary repairs were justified or whether a new structure should be built. It is a basic responsibility, given the division engineer and general foreman buildings and bridges, to determine in each case when such studies should be inaugurated and make the necessary recommendations.

It is my opinion that such records kept on all buildings would not be economically feasible or justified.

Records Should Save, Not Cost

By N. H. Williams

Bridge & Building Master, Delaware & Hudson, Oneonta, N. Y.

The answer is yes, and in sufficient detail to provide the information that the person responsible for the operation requires for the type of work done. "Management," represented by the line officer in charge, is responsible for the type and scope of the records maintained.

Corrective maintenance is expensive. It does not justify much more than a carbon copy of the foreman's daily labor and material reports be kept on file. What is needed is cost of operation as a unit, not unit costs. Such records are valuable. They also serve as a constant reminder that there are better and less expensive ways of doing maintenance work.

Records kept of the cost of programmed maintenance work should show, in addition to the total cost, the step-by-step, day-by-day, cost of the job. These figures can be compiled in the office from information supplied by the foremen doing the work. They are not necessarily unit costs. They provide a means of control by providing comparison of the actual job costs with estimated costs.

There are two categories of programmed maintenance, preventive maintenance and constructive maintenance. Preventive maintenance includes general building repairs on an individual basis with minor alterations of the structure usually planned. Constructive maintenance is the major remodeling of an existing structure or the building of a new facility—with maintenance forces.

Programmed maintenance is the brainchild of a planned administration. A planned administration does flexible thinking. It analyzes the cost records of current work. It sets up standards of performance that are landmarks of a planned, well-organized program of doing the work—a program that connotes a desire to prepare and use cost-control records.

Records are not the first step in cost control. The first step is the preparation of a general plan for doing the work. From the general plan the next step is preparation of a program for doing the work as follows:

(1) Write out the sequence of the various operations.

(2) List the equipment needed on the job and where it should be placed.

(3) Determine the number of gangs required and the number of men in each gang.

(4) Schedule material deliveries.

(5) Prepare a schedule for the work, operation by operation. Establish who is to do what. See that sketches or plans of the various construction details are available for the foremen. Job costs increase when a foreman spends time in designing portions of the work as he goes along.

(6) Set up goals.

(7) Prepare forms for reporting unit costs and see that they are correctly used.

(8) Review your general plan and program. Appraise your performance. Recommend remedies for quality and quantity shortcomings.

Records should save money—not cost money.

Building Records a Necessity

By J. G. Smith

Assistant Supervisor Bridges and Buildings, Chesapeake & Ohio, Clifton Forge, Va.

Records of the repairs to individual buildings should be kept in some form, as they are a necessity to the smooth operation of a building maintenance organization. The records kept would have to be suitable to the type of buildings and territory being maintained because a territory made up of small stations, shelter sheds, toolhouses and the like would not require as elaborate a set of records as one with large terminal buildings, diesel facilities, etc.

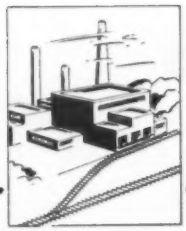
In my opinion, a record system set up as a card file is the most efficient and useful. The record should include two or more cards, stapled together for each building, set up according to territories. One card should list individual building characteristics and the others should list repairs.

The first card should include such information as location, division, building number, overall size (a sketch on back is helpful), height from foundation to eaves, height above eaves, type, type foundation, sizes of various structural members (sills, floor joists, posts, studs, belt, plate, roof joists, rafters), type floor, type siding, type roof deck, type roofing, number of windows and doors, number of chimneys, type heat, lights, water, year built, contents, approximate value of contents and remarks. The second and other cards should list the repairs briefly and the dates on which they were completed.

The supervisor, an assistant or other person with first-hand information as to when and what repairs were made should be responsible for keeping these cards up to date. As a job is completed the card should be brought up to date.

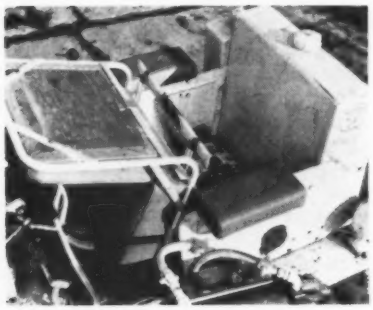
A record of repairs to buildings can be helpful in many ways. Frequently, cost data have to be compiled and it is most convenient to have access to accurate information quickly and not have to rely on memory or work through seemingly endless stacks of time—distribution and material reports to secure the information required. If specific dates are known from the building records, it is a simple job to refer to the proper time or material records.

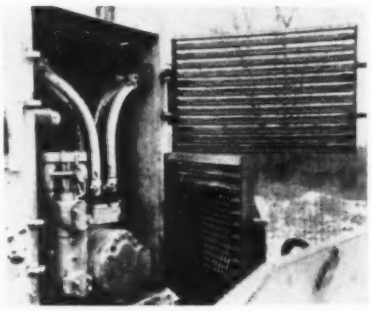
Records can be used to good advantage from year to year in the building maintenance program. The scheduling of roof renewals, painting, etc., can be more accurately set up on the basis of past knowledge. The cost of an operation can be estimated quickly by referring to the record of what was required to perform a like or similar operation on the same or another building. The test of materials and the comparison of one manufacturer's product with that of another can be effectively made through the use of building records. Inferior products can be weeded out and the superior ones used. This will result in greater long-range savings. There are other ways in which a building-repair record can be used and each individual can find out very soon how these records can best serve his own needs.

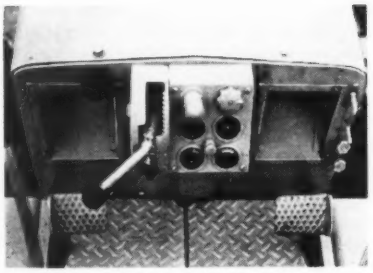


PRODUCTS OF MANUFACTURERS . . .

. . . new, improved equipment, materials, devices







ABOVE—Fold-over-seat, permitting easy servicing of steering clutch assemblies, is standard on TD-6 and TD-9 models.

UPPER RIGHT—Radiator guards are hinged on TD-14 and TD-18 models. This provides access to front hydraulic pumps.

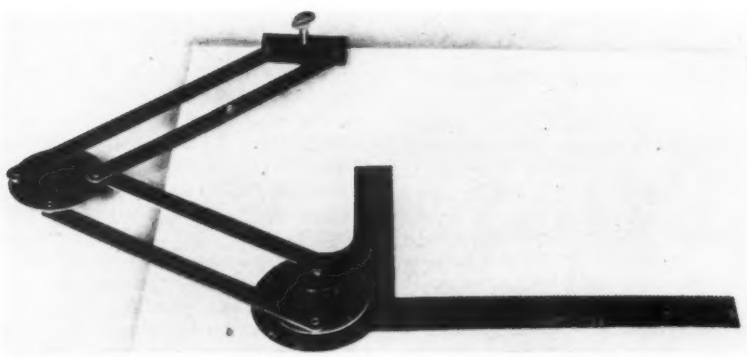
RIGHT—Non-skid steel decks, instrument grouping on panel, and control levers with spring boosters are on all models.

IMPROVED TRACTOR LINE

ENGINEERING improvements to four models (TD-18, TD-14, TD-9, and TD-6) of the International crawler-tractor line are reported to have increased horsepower ratings and improved operation and appearance. Drawbar horsepower for these models is now 103, 78.5, 54.5 and 41.5, respectively. A new Cerametallic clutch facing of heat-resistant material, similar to that used as brake lining on jet aircraft, has been used on all models. The appearance of all models has been improved by streamlining over the hood and radiator grill, which is reported to give a clear view of all front-end operations. In addition, decks are now made from non-skid steel and provide more leg room, instruments are grouped in a cluster on the instrument panel, and control levers have been equipped with spring boosters which are said to have reduced pull effort by 25 per cent thus aiding the operator.

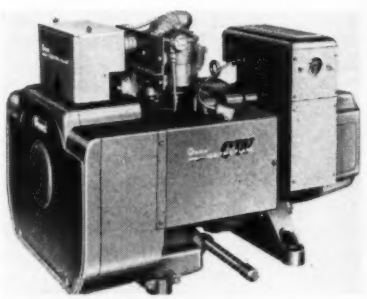
A foldover seat on the TD-6 and TD-9 models padded with thick foam rubber is standard equipment and provides access for servicing of the steering clutch assemblies. Radiator guards on the TD-14 and TD-18 models have been hinged to permit servicing of the front-end hydraulic pumps.

Model TD-18 also includes new 500-hr track-roller seals, heavier radiator guards and gasoline-conversion electric starting system as standard equipment. Lubrication of the steering-clutch assemblies has also been centralized on this model and pressurized cooling has been provided. Model TD-6 now comes with all-weather electric starting as standard equipment. *International Harvester Company, Dept. RTS, 180 N. Michigan Ave., Chicago 1, Ill.*



POCKET-SIZE DRAFTING MACHINE

A PORTABLE drafting machine is precision built of anodized aluminum and is capable of covering an area 11 in by 17 in. Known as the Draftette, the device is equipped with scales which have been calibrated to 0.0005 in. It is reported that this machine can be easily attached to a drawing board or sketch pad or folded and slipped into a man's pocket when not in use. This feature is said to make it particularly adaptable for field use and eliminates the necessity of carrying rulers, protractors, T-squares and triangles into the field when making routine sketches. *David Miller & Associates, Dept. RTS, P. O. Box 572, Beverly Hills, Calif.*



VACUUM-COOLED GENERATOR

A NEW 7500-WATT ac, air-cooled, gasoline-powered electric generating plant is suitable for mobile and portable uses. The plant, known as the 705 CW, features a new type of cooling system called Vacu-Flo.

The new system employs a powerful centrifugal blower that pulls cooling air

(*Continued on page 56*)

"THAT ONE DAY" . . .

"I SPENT RIDING YOUR SPRAY TRAIN SURE WAS AN EYE-OPENER"

"LIKE many another engineer, I thought in terms of doing my own spraying, when I started to use weed killer some years ago, and we did our own spraying for a period of years. But, when I rode your train, studied your spray car design, and observed your accomplishment in one working day, I realized that your business is very highly specialized. In my opinion, *no railroad can hope to duplicate this accomplishment on a self-service program.* A railroad is not geared up to concentrate on this one job, as your organization is. From now on, I want READE spraying service as well as READE chemical."

We welcome a review of your weed or brush control program. Long experience in this type of work pays off in benefits and economy.

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READE MANUFACTURING COMPANY, INC.

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through the generator and over heated engine parts. It then expels the heated air through a duct to the outside. It is said that this feature enables the plant to be installed in completely enclosed compartments in a space just slightly larger than the unit and its accessories.

The unit is powered by a 20-hp, two-cylinder opposed, 4-cycle engine and is readily trailer-mounted, or available on a skid or dolly. It can be equipped with a sheet-steel weatherproof housing which is said to enable it to deliver its full-rated power in all types of weather.

The generator is of the 4-pole, self-excited, single ball-bearing type, directly connected to the engine to assure permanent alinement. The generator provides a 12-volt battery charging output and is cooled by the main engine blower. *D. W. Onan & Sons, Inc., Dept. RTS, Minneapolis 14, Minn.*

ANTI-SKID COATING FOR FLOORS

A RUBBER-BASED compound, which produces an abrasive-type coating, is used to impart anti-skid properties to metal, wood and concrete surfaces. Known as DC 1005, the coating is said to provide better footing and traction on floors, stairsteps, inclined ramps, catwalks, etc. It is frequently used on floors around machines, where oils or coolants may cause hazardous conditions.

The manufacturer recommends that the compound be applied in a thin, uniform coat about $\frac{1}{16}$ in thick over the area to be skidproofed. It can be obtained in various colors as desired and applied by either a brush, trowel or heavy-duty spray equipment. *Daubert Chemical Company, Dept. RTS, 333 N. Michigan Ave., Chicago.*

1 SIZE

Fits all rail sections—

That includes worn rail, too. No matter what kind or condition of rail, one size of *Compression* Anchor does for all.

Think of the savings in record-keeping and in distribution!

Compression Anchors give you two-way holding, always maintain correct expansion gaps. And for welded or "tight" rail, they are the best known means of anchoring.

Compression RAIL ANCHORS

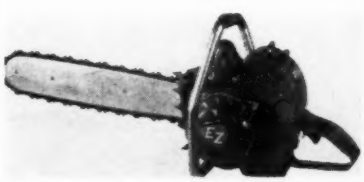
The RAILS Company

RAILS-CO

Hoboken · Chicago · St. Louis

NEW SPREADER FOR WEED CHEMICALS

A NEW SPREADER, known as the PBC spreader, is designed primarily for use in applying granular weed killing chemicals. The swath area has been limited to about six feet which is said to be ideal for such herbicides. The unit weighs 6 lb, has a 25-lb capacity, and is said to be accurately calibrated with adjustable rates of application. Rates of application as low as ¼ to ½-lb per 100 sq ft are said to be possible. *Pacific Coast Borax Company, Dept. RTS, Los Angeles, Calif.*



CHAIN SAW HAS DIRECT DRIVE

A NEW LIGHTWEIGHT, direct-drive chain saw is designed for easier and faster wood cutting operations. Called the

Model EZ, the saw weighs only 19 lb. Its light weight is said to make it ideal for limbing or undercutting as well as felling, bucking, notching and boring. It is also said to be perfectly balanced, and an all-angle diaphragm carburetor allows cutting in any position.

The EZ is powered by a 5-hp engine and is available with 12-in, 17-in, 21-in and 30-in guide bars. It is said the saw will bring down trees up to 3 ft in diameter and will cut through 8-in oak in 5 sec and through 18-in pine in 14 sec.

Included in the many features of the saw are: An integral cooling fan, aviation type cylinder with chrome plated bore, waterproof and dustproof ignition, aluminum piston, needle bearing on connecting rod, ball bearings on shaft and pinions, and die cast magnesium and aluminum alloy construction. *Homelite, Dept. RTS, 75 Riverside Ave., Port Chester, N. Y.*

SHARPENS ALL CUTTING TOOLS

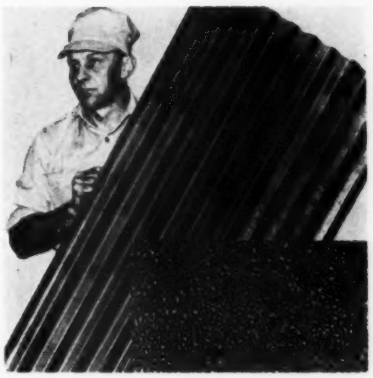
A NEW MACHINE, called the Sharp Smith, is designed to sharpen all cutting tools. It is said to do a precision job of sharpening all scythes, axes, picks, mattocks, hoes, shovels, brush hooks, shears, snips, chisels and planer-jointer knives. It is also said to joint, gum, sharpen and set all circular saws.

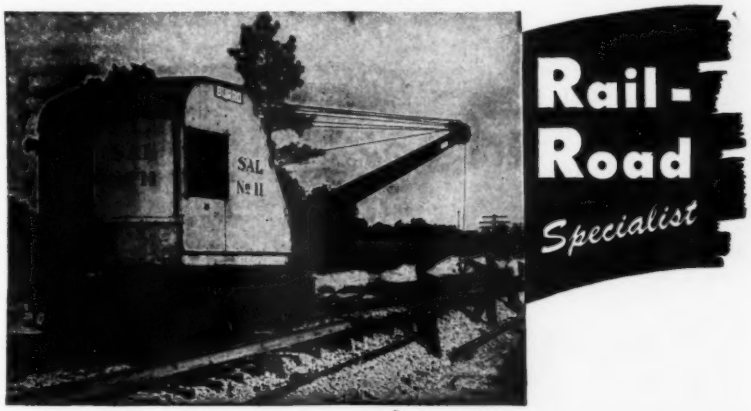
The unit is equipped with a ¾-hp ball-bearing motor and plugs into any 110-volt ac outlet. The manufacturers claim that no experience is necessary to operate the machine. *Belsaw Machinery Company, Dept, RTS, Kansas City, Mo.*

PANELS MADE MORE DURABLE

A GLASS-FIBER reinforced plastic building panel is available for use in skylights, sidelights, awnings, canopies, patios and other weather exposed installations. The new product, designated "grantized" Corrulux, is said to be the result of an entirely new manufacturing process and will last up to six times longer than ordinary plastic panels.

The most apparent feature of the new product is its surface which is evenly sprinkled with minute facets of tough polyester. The manufacturer claims the granitizing process is not a coating or glazing process, but rather one which molecularly bonds the polyester resins over the glass fibers and throughout the panel, thus providing a more thorough protection from the elements. In addition, the jeweled surface of the panel is said to create a turbulent cleansing action from rain or hosing. *Corrulux Division, L-O-F Glass Fibers Company, Dept. RTS, Box 20026, Houston 25, Tex.*





We call Burro Cranes "Railroad Specialists" because they do so many railroad jobs so well. Track work, bridge work, bulk materials handling, Mechanical Stores Department, material handling with or without magnet, are only a few jobs Burro does with speed and economy. Burro Cranes are designed for railroad work—not adapted to it. Watch a Burro work and see why it's called on to do so many jobs by most of the country's railroads.

Only BURRO CRANES HAVE:

- Fast travel speeds—up to 22 M.P.H.
- Draw Bar Pull of 7500 lbs. (often eliminates need for work train or locomotive).
- Elevated Boom Heels for working over high sided gondolas.
- Short tail swing—will not foul adjoining track.
- Low overall height—Burro can be loaded and worked on a standard flat car.

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THE MONTH'S NEWS...

. . . among railway men—the associations—the suppliers

Changes in Railway Personnel

General

D. T. Faries, engineer track for the Bessemer & Lake Erie at Greenville, Pa., has been appointed assistant superintendent with the same headquarters.

C. G. Hammond, Jr., roadmaster on the Norfolk & Western at Williamson, W. Va., has been appointed assistant trainmaster with headquarters at Petersburg, Va.

Sidney L. Mapes, chief engineer of the Jersey Central at Jersey City, N. J., has been appointed to the newly created position of assistant vice-president. Mr. Mapes was born at Port Jervis, N. Y., on June 15, 1890, and joined the Jersey

Sidney L. Mapes

Central in 1911 as a rodman in the engineering department. He subsequently held positions as assistant supervisor of track, assistant engineer, assistant engineer maintenance of way, engineer maintenance of way and assistant general manager until his appointment as chief engineer in May 1947.

Engineering

Joseph C. Brennan, division engineer on the Delaware & Hudson at Oneonta, N. Y., has been promoted to engineer maintenance of way, with headquarters at Albany, N. Y. Mr. Brennan succeeds **Orville W. Stephens,** whose death was noted in the April issue.

H. F. Gilzow, assistant engineer in the chief engineer's office of the Frisco at Springfield, Mo., has been appointed assistant process engineer, with the same headquarters. **B. E. Buterbaugh,** assistant engineer, Eastern division, North and South, at Springfield, replaces Mr. Gilzow.

Howard Watts, Jr., assistant to the division engineer on the Seaboard Air Line at Americus, Ga., has been promoted to assistant division engineer with the same headquarters. **W. A. Thompson, Jr.,** student engineer at Raleigh, N. C., has been promoted to assistant to the division engineer with headquarters at Savannah, Ga.

P. H. Geelhart, assistant division engineer and assistant engineer on the Milwaukee at Sioux City, Iowa, has been promoted to division engineer with headquarters at Miles City, Mont., replacing **H. E. Hurst** who has been transferred to LaCrosse, Wis. Mr. Hurst succeeds **I. C. Brewer,** who has been assigned other duties at Milwaukee, Wis.

Bernard J. Minetti, assistant chief engineer of the Jersey Central at Jersey City, N. J., has been promoted to chief engineer at that point, succeeding **Sidney L. Mapes,** whose appointment as assistant vice-president is announced elsewhere in these columns. The position of assistant chief engineer has been abolished.

A photograph and biographical sketch of Mr. Minetti were published in the March issue.

H. E. Kirby, cost engineer on the Chesapeake & Ohio at Richmond, Va., has moved his headquarters to Huntington, W. Va.

Edward R. Sanner, office engineer on the Southern at Knoxville, Tenn., has been promoted to assistant to chief engineer maintenance of way and structures, Central Lines, with headquarters at Atlanta, Ga.

Robert J. Clarke, assistant office engineer for the Pennsylvania at Philadelphia, Pa., has been promoted to engineer of structures, Buckeye Region, with headquarters at Cincinnati, Ohio. Mr. Clarke succeeds **C. F. Montaque,** who has been assigned other duties at Philadelphia.

V. M. Schwing, supervisor of track on the Bessemer & Lake Erie at Greenville, Pa., has been promoted to engineer track at that point, replacing **D. T. Faries,** whose appointment as assistant superintendent is announced elsewhere in these columns.

L. M. Poitevin, division engineer on the Canadian National at Levis, Que., has been promoted to assistant district engineer, Quebec District, with headquarters at Quebec, Que. **J. R. Brayne,** assistant division engineer at Levis, succeeds Mr. Poitevin.

Bernie Beaver, office engineer on the Pueblo division of the Denver & Rio Grande Western at Denver, Colo., has been promoted to assistant engineer with the same headquarters. **Arthur G. Cudworth,** assistant engineer of structure, at Denver, has been promoted to engineer of structures, replacing **Orwin K. Peck,** who has retired.

Mr. Peck was born in Litchfield, Ohio, in 1882 and graduated from Dakota Wesleyan University in 1904 with a BA degree. He also attended the University of Wisconsin and in 1907, graduated with a BS degree in general engineering.

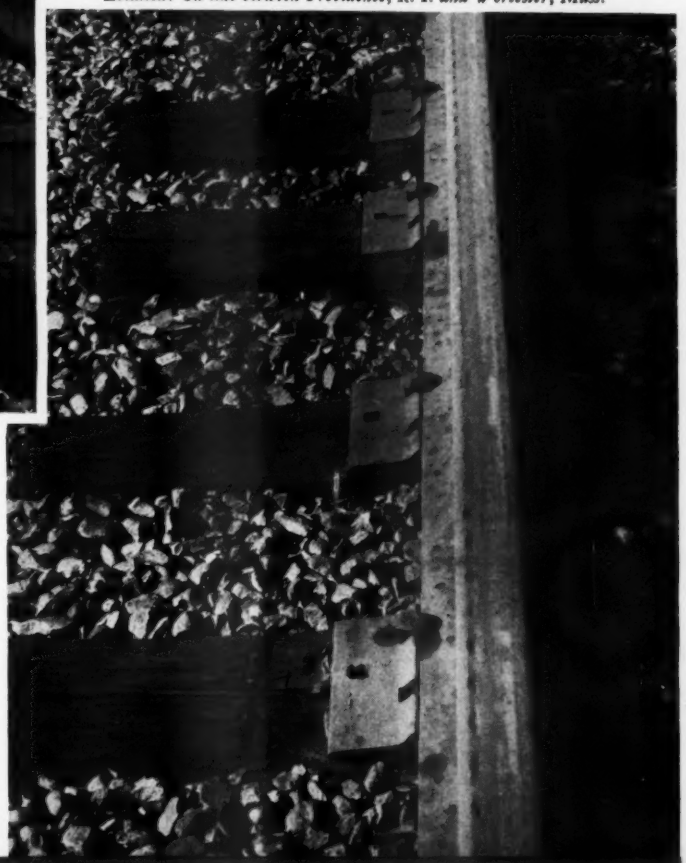
Orwin K. Peck

He began his railroad career in 1908 as a bridge designer with the Northern Pacific and subsequently served in the bridge department of the Canadian National, Louisville & Nashville and the Detroit, Toledo & Ironton. He joined the D&RGW in 1921 as bridge engineer and was made engineer of structures in 1939, which position he held until his recent retirement.

H. E. Weatherly, whose promotion to division engineer of the San Antonio division of the Texas & New Orleans at El Paso, Tex., was announced recently (*RT&S,* March, p. 90), was born on October 14, 1901, at Timpson, Tex., and obtained his engineering education at Rice Institute. He entered railway service with the Texas & New Orleans in 1925 as a chainman on the Lafayette division and subsequently held positions as rodman and instrumentman until December 1930 when he left the road because of

(*Continued on page* 60)

Pictures: Courtesy N.Y.N.H.&H.R.R.Co.
Location: On line between Providence, R. I. and Worcester, Mass.



▲ *BIRD SELF-SEALING TIE PAD AFTER 5 YEARS' SERVICE is removed for inspection purposes. It was necessary to pry the pad from the tie owing to the tenacious seal that is characteristic of all Bird Tie Pads. Reapplied and becoming resealed after inspection, the Bird Tie Pad is good for many additional years of protective service.*

TYPICAL INSTALLATION OF BIRD SELF-SEALING TIE PADS applied out-of-face with new 115 lb. rail and 7¾" x 12" plates. Ties have been mechanically adzed where necessary to provide a smooth surface on sound wood and will start a new life cycle of reliable service through the protection afforded by Bird Self-Sealing Tie Pads. Beading at ends of pads is due to extrusion of surplus coating material and is indicative of proper pad performance. It is part of the effective seal provided by Bird Self-Sealing Tie Pads. ▶

Slash your tie costs 50% with BIRD Self-Sealing TIE PADS

HOW?

Bird Self-Sealing Tie Pads eliminate mechanical wear and plate penetration . . . form a waterproof, dustproof seal on the tie that protects the vulnerable area under plates and around spikes.

WHERE?

- On the joint and shoulder ties of insulated joints.
- On new or older bridge decks.
- On switch timbers.
- Under crossing frogs.
- Through highway grade crossings and station platforms.
- On curves to insure holding track to gauge and surface.
- With smaller tie plates.
- Out-of-face with new or relayer rail.
- On pile cut-offs.

RESULTS

- You get 50% extra life from new ties.
- You get twice the normal remaining life expectancy from old ties that can be adzed to a smooth surface of sound wood.
- You save on gauge, line and surface maintenance costs in addition to savings on tie life.

WHEN

You start saving as soon as you start using Bird Self-Sealing Tie Pads. Bird's is the original self-sealing tie pad . . . proven by years of in-track service. Write for further information, today . . . Bird Tie Pads, Dept. HTS-5, East Walpole, Mass.

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Self-Contained

NO NEED FOR-
COMPRESSORS
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- Heavy-duty, rugged construction for driving concrete, steel or wood piling.
- Quick conversion of crane to mobile pile driving rig.
- In capacities of 5,000, 12,000 and 20,000 ft. lbs. per blow.

Write for Catalogue data—FREE

SYNTRON COMPANY
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Railway Personnel (Cont'd)

force reduction. On December 28, 1931, he rejoined the road as a laborer in the maintenance-of-way department at Houston and was promoted to section foreman in November 1933. He was transferred to the engineering department as a levelman in 1937 and was advanced to senior instrumentman in 1939. He was promoted to roadmaster of the Edinburg district in 1940 and was transferred to the Cuero district in 1941. He was advanced to assistant division engineer at El Paso on March 16, 1948, which position he held until his recent appointment.

Howard B. Clarkson, who has been promoted to engineer of structures on the Delaware & Hudson at Albany, N. Y., (*RT&S*, Feb. p. 79), was born on November 15, 1924, at Sharon, Conn., and was graduated from Rensselaer Polytechnic

Howard B. Clarkson

Institute in 1951 with a BS degree in civil engineering. He began his railroad service with the Delaware & Hudson in June 1951 as a levelman and was advanced to draftsman in January 1952. He was promoted to assistant engineer at Albany in October 1953, which position he held until his recent promotion.

R. G. Maugham, who has been promoted to bridge engineer on the Canadian National at Moncton, N. B. (*RT&S*, March, p. 86), was born on July 27, 1921, at Toronto, Ont., and graduated from the University of Toronto with a BS degree in civil engineering. Mr. Maugham began his railway service with the Canadian National in November 1945 as a structural designer. He was advanced to structural engineer in November 1949 and was promoted to assistant bridge engineer in September 1955, which position he was holding at the time of his recent promotion.

J. W. Bolstad, who has been appointed assistant engineer of track on the Northern Pacific at St. Paul, Minn. (*RT&S*, April, p. 71), was born on March 10, 1918, at Sioux City, Iowa. Upon graduation from the University of Wisconsin in 1940, he entered the service of the Northern Pacific as a chainman at Missoula, Mont. After serving as a rodman and instrumentman and spending 3½ years in the armed forces, Mr. Bolstad returned to the road and was named assistant engineer at St. Paul in February 1951. He was promoted to division engineer at Glendive, Mont., in June 1951 and was advanced to assistant district engineer in March 1953, which position he was holding at the time of his promotion to assistant engineer of track.

Donald G. West, whose promotion to industrial placement engineer on the Detroit, Toledo & Ironton at Dearborn, Mich., was announced recently (*RT&S*, April, p. 71), was born at Port Huron, Mich., on August 11, 1927, and received

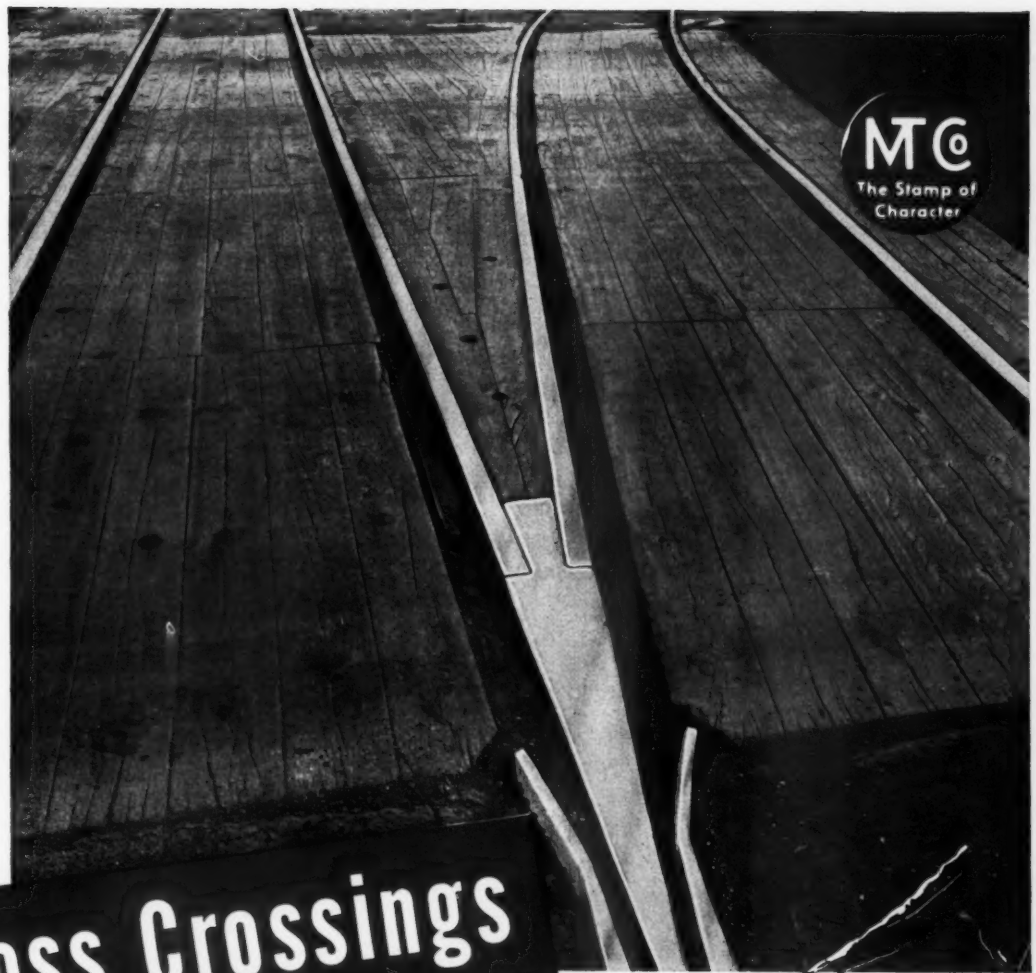
Donald G. West

his engineering education at Michigan State University while participating in the army specialized training program. Mr. West began his railway career with the Grand Trunk Western in 1947 at Detroit, Mich. In December 1952, he entered the service of the DT&I as a rodman at Dearborn and was promoted to assistant office engineer on August 1, 1953. He subsequently held positions as field engineer and office engineer at that point until February 1955, when he was promoted to track supervisor at Lima, Ohio. He was holding this latter position at the time of his recent promotion.

R. E. Catlett, who has been promoted to assistant division engineer on the Frisco at Chaffee, Mo. (*RT&S*, March, p. 86), was born on October 28, 1926, at Decatur, Ala., and was graduated from the Alabama Polytechnic Institute with a BS degree in civil engineering in 1950. He began his railway service on May 1, 1950, as a student apprentice on the Frisco's subsidiary, the Alabama, Tennessee & Northern at Mobile, Ala. In December 1950, he was transferred to Tulsa, Okla., and was advanced to student supervisor at St. Louis, Mo., in May 1952. He was promoted to assistant roadmaster in October 1952 at Sherman, Tex. He was advanced to roadmaster at Hugo, Okla., in June 1953 and was transferred to Fort Smith, Ark., in January 1954, which position he held until his recent promotion.

Bruce G. Anderson, who has been promoted to principal assistant engineer on the Great Northern at St. Paul, Minn.

(*Continued on page* 63)



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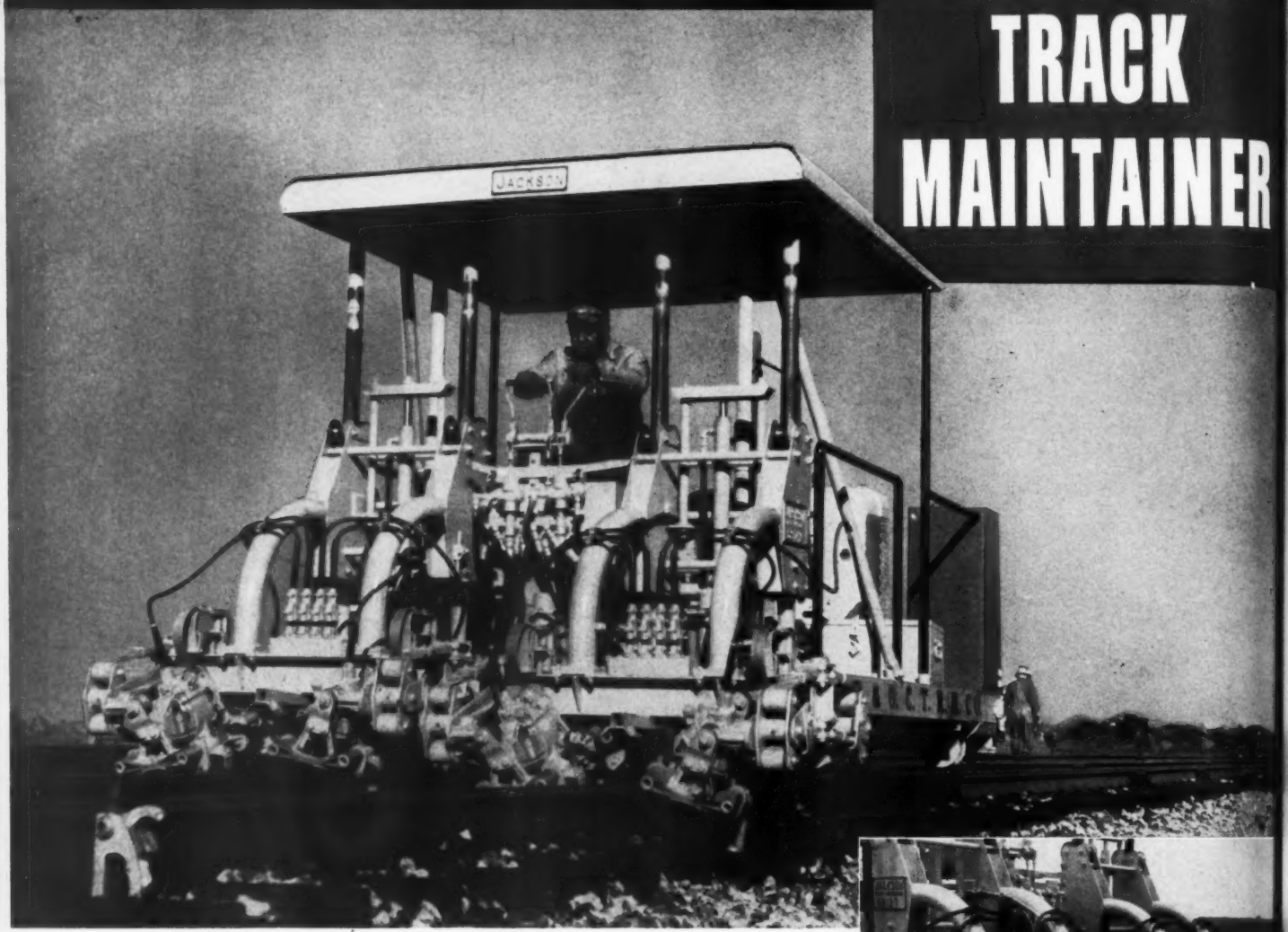

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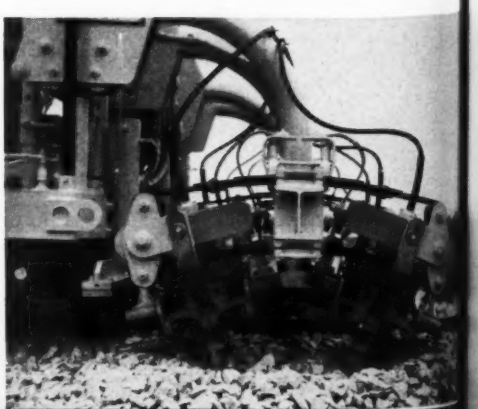

(*RT&S*, April, p. 71), was born on September 7, 1918, at Spokane, Wash., and graduated from Washington State College in 1940 with a BS degree in civil engineering. Mr. Anderson began his railway service with the Great Northern in 1942 as a member of the engineering department at Whitefish, Mont. In 1942, he entered military service where he spent nearly four years. In December 1945, he returned to the Great Northern and was advanced to instrumentman in October 1946. He was promoted to division engineer at Great Falls, Mont., in November 1949 and was advanced to office engineer at Seattle in January 1954, which position he held until his recent promotion to principal assistant engineer at St. Paul.

H. B. Orr, whose promotion to division engineer on the Chesapeake & Ohio at Clifton Forge, Va., was announced recently (*RT&S*, March, p. 87), was born

H. B. Orr

on June 10, 1914 at Muncie, Ind., and was graduated from Purdue University in 1936 with a BS degree in civil engineering. Mr. Orr began his railway service with the Wabash on May 1, 1936, as a rodman at Lafayette, Ind. Later that same year, he joined the Chesapeake & Ohio as a chainman at Richmond, Va., and subsequently held positions as rodman, draftsman, assistant cost engineer and assistant supervisor of track. He was promoted to supervisor of track, Ashland division, Pikeville, Ky., on January 1, 1946. He was advanced to assistant division engineer at Clifton Forge in 1947, and was transferred to Russell, Ky., in 1954, where he remained until his recent promotion.

As reported on page 79 of the February issue, **Edward Penrose,** engineer of structures for the Delaware & Hudson, has retired. A biographical sketch of Mr. Penrose, published on page 72 of the April issue, incorrectly stated that Mr. Penrose had been appointed engineer of structures.

Fred L. Monroe, engineer in charge of drainage for the Southern Pacific at

(*Continued on page* 66)

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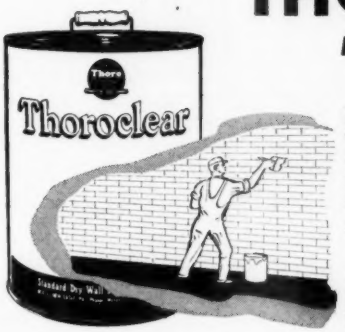

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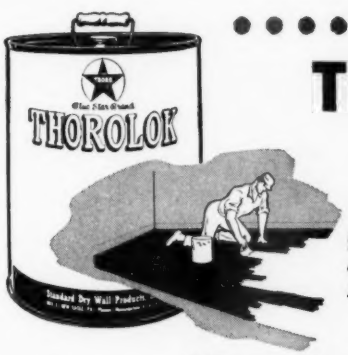

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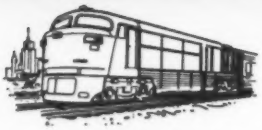

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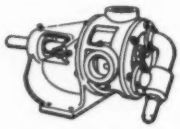

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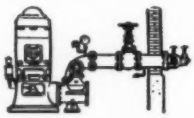

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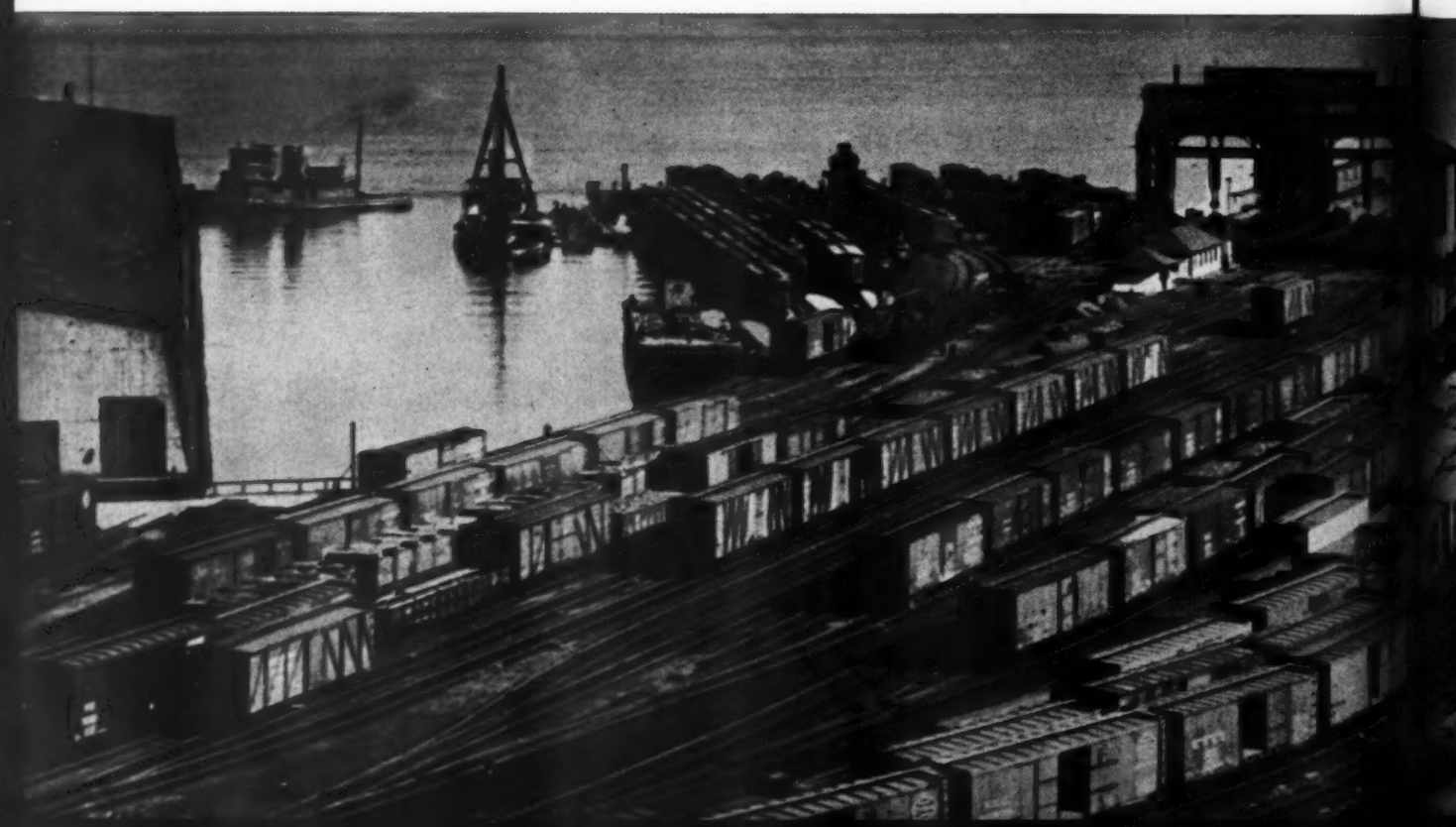

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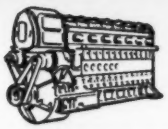

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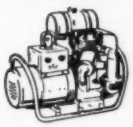

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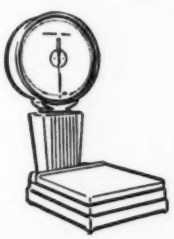

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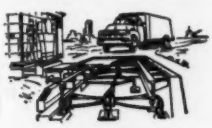

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Address.....
City..... Zone... State.....

Railway Personnel (Cont'd)

San Francisco, Calif., has retired. **Roy W. Putnam,** who recently took a leave of absence from his position as engineer maintenance of way and structures at San Francisco (*RT&S*, March, p. 92), has retired, effective March 31. **Harry M. Williamson** has succeeded Mr. Putnam as engineer maintenance of way and structures.

Track

H. C. Windham, track supervisor on the Central of Georgia at Leeds, Ala., has been transferred to Sylacauga, Ala.

H. D. LeRoy, assistant supervisor of track on the Illinois Central, has been promoted to supervisor of track, Iowa division, with headquarters at Freeport, Ill. Mr. LeRoy replaces **R. I. Dankbar,** who has resigned. **D. O. Clark,** supervisor of track at Olney, Ill., has been transferred to LaSalle, Ill., replacing **C. A. Hagen,** who has been transferred to Memphis, Tenn. Mr. Hagen succeeds **R. W. Blaylock,** who died recently.

S. W. Sweet, assistant supervisor track on the Bessemer & Lake Erie, has been promoted to supervisor track with headquarters at Greenville, Pa. Mr. Sweet succeeds **V. M. Schwing,** whose promotion to engineer track is announced elsewhere in these columns.

Andrew H. Steele, Jr., assistant roadmaster on the Norfolk & Western at Portsmouth, Ohio, has been promoted to roadmaster with headquarters at Williamson, W. Va., succeeding **C. G. Hammond, Jr.,** whose appointment as assistant trainmaster is announced elsewhere in these columns. **Cecil M. Johnson,** inspector in the office of manager of roadway maintenance, replaces Mr. Steele.

John W. Falk, Jr., whose promotion to track supervisor on the Southern at Keysville, Va., was announced recently (*RT&S*, April, p. 79), was born on April 3, 1932, at Concord, N. C. and began his railway career in 1952 with the Southern as a section laborer at Concord. He attended Georgia Institute of Technology and graduated in 1955 with a BS degree in civil engineering. In January 1955, he rejoined the Southern as a student apprentice at Charlotte, N. C., and was advanced to assistant track supervisor at Columbia, S. C., in June 1955, which position he held until his recent promotion.

G. G. Richardson, who has been promoted to branch-line roadmaster on the Northern Pacific at Jamestown, N. D. (*RT&S*, April, p. 78), was born on August 13, 1923, at Delta, Colo. After graduating from high school in 1940, he entered the service of the Northern Pacific as a member of the engineering department at Seattle, Wash. On March 1, 1954, he was appointed track apprentice on the road's Tacoma division and was promoted to assistant roadmaster, Idaho division, on April 1, 1955, which position he held until his recent promotion.

(*Continued on page* 68)

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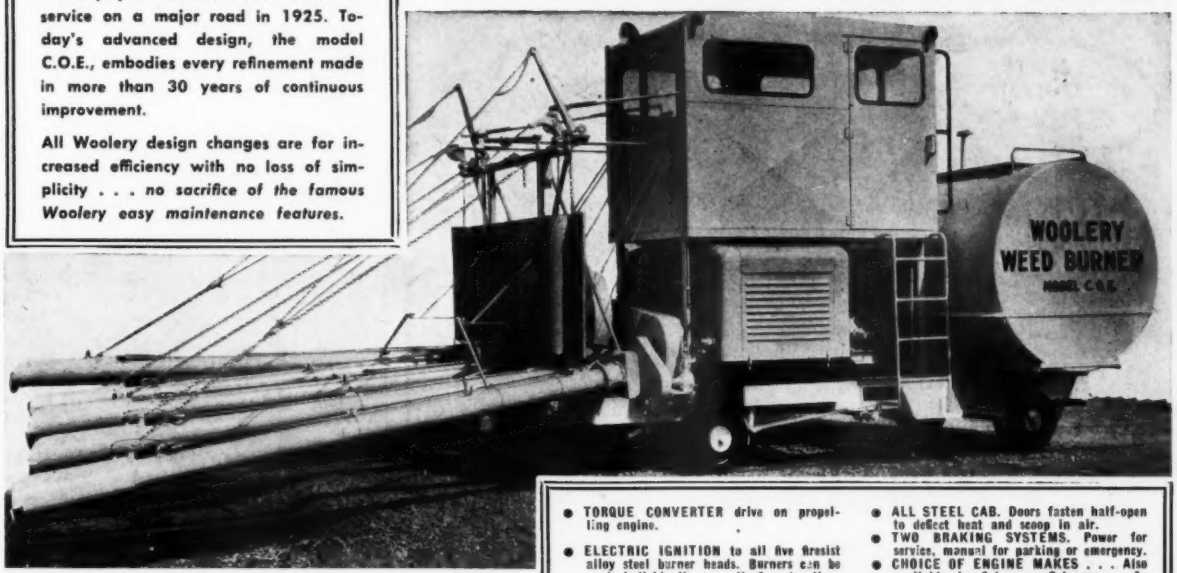

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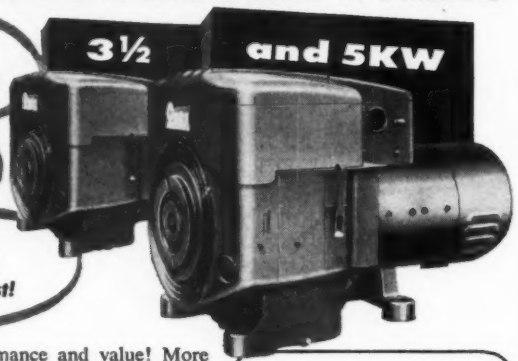

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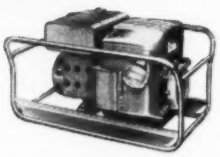

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Railway Personnel (Cont'd)

Fred Pawliw, assistant roadmaster on the Kinghorn subdivision of the Canadian National, has been promoted to roadmaster at Hornepayne, Ont., succeeding **J. Belki.** Mr. Belki has been transferred to North Bay, Ont., succeeding **G. S. Warner,** who has been transferred to the Northern Ontario district, with headquarters as before at North Bay.

Mr. Pawliw was born on August 28, 1914, at Drobot, Sask. He began his railway service with the Canadian National on September 15, 1941, as a section laborer and subsequently held positions of relief foreman, assistant extra gang foreman and extra gang foreman. He was promoted to assistant roadmaster on the Kinghorn subdivision in July 1951, and was appointed acting roadmaster and supervisor of construction of the road's Manitowadye branch in March 1955, which position he held until his recent promotion.

Marion T. Pruett has been appointed general track supervisor on the Southern Pacific with headquarters at San Francisco, Cal., succeeding **C. S. Conner,** who has been promoted.

Mr. Pruett was born at Bucklin, Kan., on April 11, 1900, and began his railway career in 1919 with the El Paso & Southwestern as an equipment operator and was advanced to section foreman in December 1920. He joined the Southern Pacific in July 1926 as a section foreman and subsequently held positions of section foreman and extra gang foreman at various points on the road until January 1938, when he was promoted to roadmaster at Alturas, Calif. He was holding this position at the time of his recent promotion to general track supervisor.

Marion T. Pruett

Bridge and Building

N. D. Bryant, assistant general foreman, B&B and WS, on the Frisco at Fort Scott, Kan., has been transferred to the road's Tennessee yard, which is now under construction near Memphis, Tenn. **A. H. Bunch** succeeds Mr. Bryant.

Association News

American Railway Engineering Association

Forsaking Chicago for the first time in 31 years, the association will hold its 1957 convention at the Sheraton-Jefferson hotel, St. Louis, Mo. The meeting will be held on March 4, 5 and 6. This decision of the association's Board of Direction was made as a result of a growing feeling among the members of the AREA that another convention city would be beneficial to both the association and its membership. Another consideration is a desire to give recognition to the many members of the association from the St. Louis area, and the Southwest generally.

For its 1958 convention, the association will return to Chicago, but the meeting will be held at the Sherman hotel instead of the Palmer House as formerly. The meeting that year will be held in conjunction with an exhibition of the National Railway Appliances Association, which will be on display at the Coliseum.

The matter of where to hold the convention in years subsequent to 1958 remains open for further consideration on the part of the AREA Board of Direction. However, the Sherman hotel has agreed to hold its facilities available for the 1959, 1960 and 1961 conventions, subject to definite action on the part of the association.

For a number of years it has been the practice for the newly elected president of the Association and the Board of Direction to hold a meeting late in April with the chairmen of the standing and special committees. In accordance with a new policy under which such meetings will be held in alternate years, no such meeting will take place this year. However, it is understood that President Wm. J. Hedley, assistant chief engineer, Wabash, is making plans to attend a meeting of each of the standing committees during the year.

At the time of going to press, four committees have scheduled meetings to be held during May. They are: Track—Engineers' Club, Chicago, May 23; Iron and Steel Structures—AAR Research Center, Chicago, May 2-3; Economics of Railway Labor—Peoria, Ill., May 21; and Water, Oil & Sanitation—Springfield, Mo., May 23.

Track Supply Association; Bridge & Building Supply Assn.

The Boards of Directors of the two associations held a meeting on March 27 to make plans for the joint exhibition which they will hold at the Coliseum, Chicago, September 17-20. The exhibition will be held during the concurrent annual conventions of the Roadmasters' and Maintenance of Way Association and the American Railway Bridge & Building Association. The two boards, at their meeting, approved the initial assignment of 260 booths to 98 exhibitors. Addi-

Duff-Norton

Aluminum Track Jacks

pay off in two important ways...

First, by increasing productivity. Actual tests by alert maintenance managements show that when a workman is assigned a Duff-Norton aluminum track jack weighing 25% less than the one he has been using, he has more energy for actual work and can keep up with modern maintenance equipment.

Second, men like them. Any tool that is easier to use always makes a hit with workmen. Duff-Norton aluminum track jacks are easier to move and spot—save a man's energy for the actual surfacing and lining work rather than preparing for it.

Get all the facts on time and energy saving Duff-Norton aluminum track jacks—Models 517BA and 117A. They have the same time-tested features that have made Duff-Norton railroad jacks favorites with section gangs throughout the world. Write the world's oldest and largest manufacturer of lifting jacks, Duff-Norton Co., P. O. Box 1889, Pittsburgh 30, Pa.—Toronto 6, Ontario. Ask for bulletin AD-18-F.

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Jacks

"Giving Industry A Lift Since 1883"

Stop Costly Dock Maintenance With New Low-Cost

Prevent Impact Damage To Docks And Eliminate Repairs

■ The damaging impact of trucks against docks is absorbed by FLEX-O BUMPERS minimizing dock, truck and freight damage. Resilient even when frozen, the bumpers need never be covered, nor will they pack or flatten. FLEX-O BUMPERS are easily installed and give you double service life because they are reversible to save you money.

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Save on Your INDUSTRIAL TRACK

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FOSTER QUALITY RELAYING RAILS

Lower installation and maintenance costs—handle more cars better. Foster nationwide warehouses also stock every New Rail Section 12# through 175#, Switch Material and Accessories to meet your specific job requirements.

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Association News (Cont'd)

tional assignments since the meeting have brought the total number of booths reserved to 267 and the number of exhibitors to 104. Companies interested in reserving space should write to Mr. Lewis Thomas, director of exhibits, Room 705, 59 E. Van Buren Street, Chicago 5.

Bridge & Building Association

The next meeting of the Executive Committee will be held on June 25 at the Engineers' Club, Chicago. In addition to routine business, the committee will discuss plans for the annual convention to be held on September 18-20 at the Conrad Hilton hotel, Chicago, and also will review preliminary drafts of the reports of subjects committees, which are now being prepared for presentation at the convention.

Roadmasters' Association

On May 14, the Executive Committee of the Association will hold a meeting at the DeSoto hotel, St. Louis, **starting at** 9 a.m. Aside from routine business the Committee will discuss plans for the annual convention to be held on September 18-20 at the Conrad Hilton hotel, Chicago. It will also review preliminary drafts of the reports of the subjects committees which are being prepared for presentation at the convention.

Supply Trade News

General

Oehlert Tractor & Equipment Co., Inc., Salina, Kan., and **Contractors Supply,** Kansas City, Mo., have been appointed parts and sales representatives for the **Bucyrus-Erie Company.** Oehlert Tractor & Equipment Co., Inc., will serve customers in the northwest section of Kansas, while Contractors Supply will serve those in southwestern Missouri and eastern Kansas.

Southern Gateway Company, Cincinnati, Ohio, has been appointed parts and sales representative for **Bucyrus-Erie Company.** The company will serve customers in southwestern Ohio, eastern Indiana and northern Kentucky.

Personal

Fairmont Railway Motors, Inc., has announced that the office address of **Kenneth Cavins,** sales manager, and **Charles Rager,** district manager, has been changed from 310 S. Michigan Ave. to 332 S. Michigan Ave., Chicago. The address of **George F. Adams,** district manager at St. Louis, Mo., has been changed from 1218 Olive St. to 611 Olive St.

William O. Bruce, sales engineer for the **Orton Crane & Shovel Co.,** has been promoted to manager of the company's railway sales department with headquarters at Chicago. After attending the University of Kansas, Mr. Bruce started his

William O. Bruce

business career in 1941 with the Rock Island. He served in various positions in the engineering department, including rodman, instrumentman, assistant engineer and draftsman, and then was transferred to the operating department as special representative to the vice-president.

In 1951 he left the railroad to form the Bruce Construction Company, a contracting firm specializing in railroad work. Early last year, Mr. Bruce joined the Orton Crane & Shovel Co. as sales engineer, which position he held until his recent promotion.

Harold R. Dunlop, sales representative at Chicago for the railway magazines published by **Simmons-Boardman Publishing Corporation,** has been appointed business manager of *Railway Track & Structures.* He succeeds **Fred W. Smith,** who is leav-

Harold R. Dunlop

ing Chicago to enter business for himself as a publishers' representative at Birmingham, Ala.

Mr. Dunlop entered the service of Simmons-Boardman in 1942, serving in the New York office until 1943 when he entered the Army Air Force, returning to the company in 1945. He served in the

(*Continued on page* 72)

AGRONYL R WEED CONTROL

Test plots 3 years ago...
25,000 Track-Miles last year!

From test plots to 25,000 track-miles a year . . . in just three years! That's the impressive record of AGRONYL R, Socony Mobil's new type weed control. AGRONYL R is a product of Socony Mobil's Research laboratories . . . was developed and perfected in cooperation with leading railroads on rights-of-way from the Gulf of Mexico to the Canadian border. It's a distinctly new kind of herbicidal oil, highly effective, and economical to use.

▶ *Self-Application*

Many railroad engineering departments are turning to *self-application* for weed control for main lines, branch lines, secondary main lines and yard application.

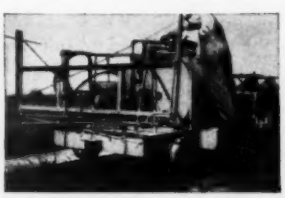
▶ *Advantages of Self-Application*

These engineering departments have studied the problem of weed control and have found they can cut costs by self-application. Self-application can be made when desired and needed, and can be made when convenient to other maintenance schedules. *Weed control is being tied in with road-bed maintenance programs.* In this way, application costs are actually reduced! Shown below are examples of actual costs by *self-application.*

WORK TRAIN... a railroad reports an AGRONYL R application at $7 per acre for the system including material cost, labor, and locomotive charges.*

SPRAY CAR (self-propelled) . . . a railroad reports an AGRONYL R application at $4.80 per acre for the system including material cost and labor.*

CONVERTED WEED BURNER... a railroad reports an AGRONYL R application at $7.60 per acre for the system including material cost and labor.*



YARD TYPE CAR... a joint-agency operation reports an AGRONYL R application for yard control at $13.90 per acre including material cost and labor.*

SOCONY MOBIL OIL COMPANY, INC., and Affiliates:
MAGNOLIA PETROLEUM CO., GENERAL PETROLEUM CORP.

We will be discussing these results and costs of application in detail with you prior to your preparation of budgets for next year. However, if you desire information sooner, we suggest you write us for the data you require.

Railroad Lubricants

RAILROAD DIVISION

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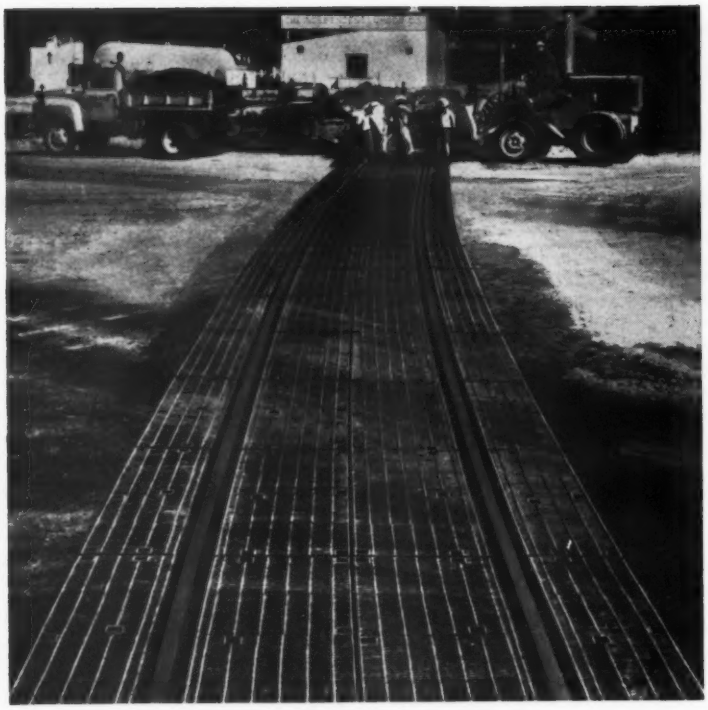
*NAMES ON REQUEST

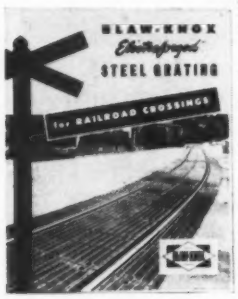


provide non-skid traction for vehicles ... smooth quiet ride for trains with

BLAW-KNOX Electroforged® STEEL GRATING CROSSINGS

You can build public goodwill, insure a smoother train ride and cut track maintenance with these modern, long life Blaw-Knox crossings.

Prefabricated sections of steel grating easily installed and maintained. One section can be removed at a time for tamping tracks, cleaning ballast or removing ties . . . without holding up train or vehicle traffic.



Open mesh self-cleaning construction permits good drainage, quick evaporation of snow and water . . . preserves life of ties.

And Blaw-Knox Electroforged Steel Grating Crossings last as long as the rails.

Send for your copy of new Bulletin 2448.

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BLAW-KNOX EQUIPMENT DIVISION
Pittsburgh 38, Pennsylvania

RAILROAD GRATING APPLICATIONS: crossings • walkways • running boards steps • tower platforms • exhaust fan guards • battery box shelves

Supply Trade News (Cont'd)

advertising department in New York until 1948 when he was transferred to the circulation department. He had been a sales representative in the Chicago office since 1953.

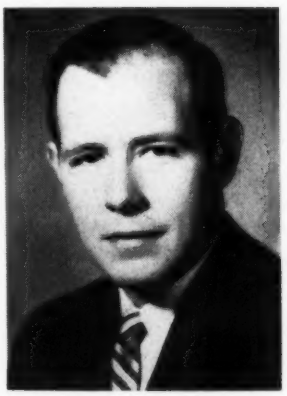
J. Frederick Byers, Jr., a vice-president of the **A. M. Byers Company,** has been elected executive vice-president, and **Albert R. Frame,** general manager of operations, has been elected vice-president in charge of operations. **Robert J. Bricmont** has been appointed manager of the engineering service department with headquarters at Pittsburgh, Pa.

Gardner-Denver Company has announced the appointment of **William T. Knoderer** as sales manager, Industrial Division, and **Niel Martin Fishback** as sales manager, Mining and Contracting Division. Both will maintain headquarters at Quincy, Ill.

William A. Stovall and **Herbert E. Waterhouse** have joined the **L. B. Foster Company** as sales representatives, with headquarters at Atlanta, Ga.

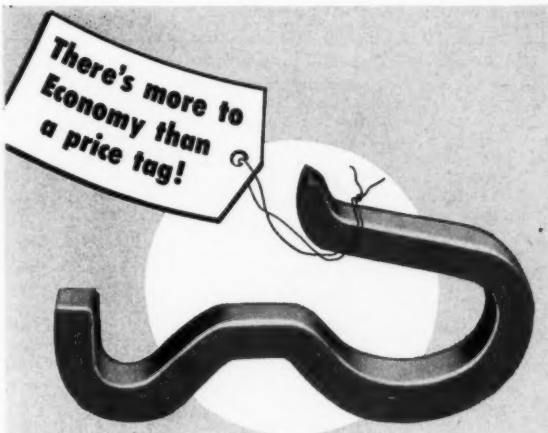
P. D. Smith IV has been appointed dealer sales manager for **Schramm, Inc. John P. Powell** has been appointed regional sales manager of Eastern territories. Both Mr. Smith and Mr. Powell will maintain headquarters in West Chester, Pa.

Charles A. Mapp has been appointed district manager, Railroad Division, Fairbanks, Morse & Co., with headquarters at Chicago. Graduating from Duke University in 1943, Mr. Mapp joined Fairbanks, Morse in January 1947 and gained



Charles A. Mapp

his initial experience in the locomotive service department. Following this, he devoted some time to locomotive sales in the Chicago area and did similar work for several years in the eastern section of the country. For the past year and half, he has been on a tour of duty in South America and returned to the United States only recently to accept his new appointment. In his new position, he will be responsible for the sale of all company products to railroads, in the Middlewest.



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Quality Durability Efficiency

The **IMPROVED GAUTIER Rail Anchor** is made of tough, durable Alloy Spring Steel. The improved GAUTIER can be used again and again on new or old rail. The improved GAUTIER is engineered so that it can't be overdriven.

When you are in the market for rail anchors, may we suggest you look further than the price tag—look to GAUTIER—for real economy.

Manufactured and sold exclusively by

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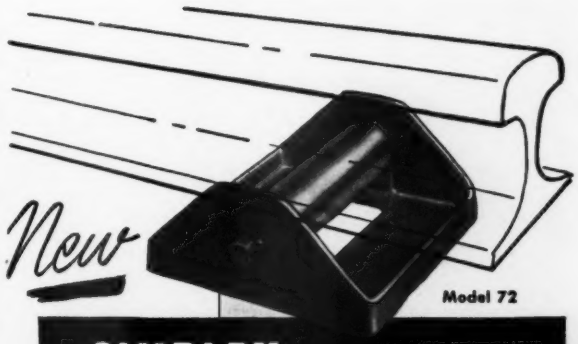

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RAIL DOLLY

Makes Rail Bumping Faster, Easier, Safer

A REAL WORK-SAVER WHEN:

- Removing Rail
- Installing New Rail
- Lining Up Bolt Holes
- Driving Up Expansion
- Adjusting Switch Points
- Installing Welded Rail

• The Rail Dolly is a heavy-duty roller mounted on a low metal stand. Used in pairs, Rail Dollies handle the heaviest of bumping rails—make accurate bumping possible with less men. Cut damage to rail ends. Far safer than swinging rails with tongs or sliding on greased plates. Guides on each side of Dolly stand prevent rail from slipping off; cleats in base anchor Dolly firmly on top of ties or ballast. Another aid in driving rail, the Simplex Rail Puller and Expander, prevents rail from returning to its original position after bumping. Both devices described in Bulletin RR 72. WRITE:

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2543 Gardner Road, Broadview, Ill.

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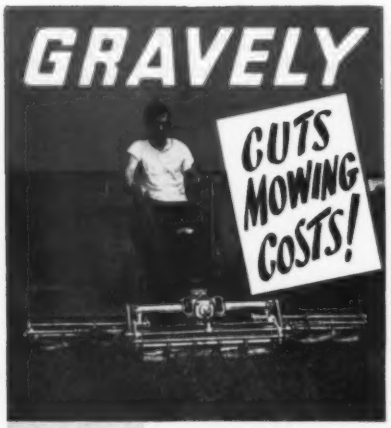

ONE 5-HP GRAVELY POWERS 3 MOWING TOOLS

YOU CUT MOWING COSTS because ONE Gravely Tractor powers all the tools shown — and more — 21 in all!

NO MORE buying an engine for each tool! Instead, ONE 5-HP Gravely with tools changed quickly (only four bolts) handles the job — for the moment, or the season!

SAVE MANPOWER too, since ONE man, with ONE Gravely, can do the upkeep jobs of a crew of eight in the same time! Mechanize the upkeep jobs — get *more* done *better,* in *less* time.

3 SNOW REMOVAL TOOLS afford YEAR-ROUND USE, in every season — an example of Gravely's versatility.

MORE for your MONEY!

5-HP — more than twice the power of the usual power mower . . all-gear drive, two speeds forward and REVERSE . . . 21 tools available!

Push-button starter optional

free!

WRITE . . . GET THE FACTS!

Send for 24-page Booklet, "Power vs Drudgery", that shows you how and why you get more for your money when you get Gravely.

PROOF BY JOB-TEST!
FREE DEMONSTRATION

WE OFFER PROOF by on-the-job demonstration. Just write for literature or FREE Demonstration today!

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Helps From Manufacturers

The following compilation of literature—including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information, write direct to the manufacturer.

1. WELDING. 28-page colorful publication (Vol. 16, No. 1, 1956) "Airco in the News" contains numerous good technical and general interest stories including the World's First Welded Cable. (Write: *Walter Goerg, Jr., News Bureau, Air Reduction Co., Dept. RTS, 60 E. 42nd St., New York 17, N.Y.)*

2. STAINLESS STEELS. 10-page booklet "The Chromium-Nickel-Manganese Austenitic Stainless Steels" gives detailed information on stainless steels that use less nickel than previous series, gives higher performance. (Write: *Adv. Dept., Allegheny Ludlum Steel Corp., Dept. RTS, 2020 Oliver Bldg., Pittsburgh 22)*

3. SAWS. 42-page plastic-spiral bound "Operator's Manual and Repair Parts List" describes, illustrates, gives specifications and prices on Belsaw line of bench saws and related items; diagrams show methods of use; includes order form-envelopes. (Write: *Belsaw Machinery Co., Dept. RTS, 315 Westport Road, Kansas City 11, Missouri)*

4. SAFETY HOIST HOOK. Illustrated catalog "Close the Gate to Accidents" describes new styles of Bullard-Burnham Safety Hooks; contains photos of hooks and connectors; lists uses on hoists and cranes. (Write: *E. D. Bullard Co., Dept. RTS, 275 Eighth St., San Francisco 3)*

5. CEMENTED CARBIDES. 66-page metalworking catalog GT-310 "Carboloy Cemented Carbides for the Metal-Working Industry" describes, illustrates, gives specifications on Cemented Carbide line; includes prices. (Write: *Carboloy, General Electric, Dept. RTS, Detroit 32)*

6. DIESEL ENGINES. 16-page booklet (DE 605) "Why Cat Diesels Are Best" shows features and advantages of Cat Diesels, discusses Turbocharging and presents schematic drawing on it, photos show customer uses, includes testimonials. Also available in Spanish, French, Portuguese. (Write: *Caterpillar Tractor Co., Peoria, Illinois)*

7. SHELVING. 12-page illustrated 2-color catalog (706) "A New Idea, Klip-Bilt Boltless Shelving Lowers Storage Costs" describes the Klip-Bilt principle, shows the various models of shelving, includes component parts and accessories. (Write: *Frick-Gallagher Mfg. Co., Dept. RTS, 110 S. Michigan Ave., Wellston, Ohio)*

8. FLOOR SURFACE HARDENER. 4-page 2-color brochure (SH 56) "Emeri-Topcrete, the Floor Surface Hardener That Lasts Longer—By Actual Test" describes, illustrates, gives recommended specifications on an easily applied, long lasting floor surface hardener. (Write: *Walter Maguire Co., Dept. RTS, 60 East 42nd St., New York 17, N.Y.)*

9. NUTS. 24-page Engineering Data Section illustrates and describes in 14 sections techniques in manufacture and proper installation of standard and special 12-pointer and hexagon nuts, Huglock and Marsden locknuts. (Write: *National Machine Products Co., Dept. RTS, 44225 Utica Road, Utica, Michigan)*

10. DUCT TAPE. Brochure tells how Permacel 691 silver cloth tape aids in duct installation, how it speeds the work and requires less labor than other methods. (Write: *Adv. Services Dept., Permacel Tape Corp., Dept. RTS, New Brunswick, N.J.)*

11. INDUSTRIAL EQUIPMENT. 24-page colorful catalog describes, illustrates and gives prices on the Precision line of lockers, storage cabinets, etc. (Write: *Precision Equipment Co., Dept. RTS, 3736 N. Milwaukee Ave., Chicago 41)*

12. TRACK LINER. 4-page 2-color illustrated bulletin (L-56) describes the Wheel-Mounted Line Master capable of lining track at speeds of 1,000 to 2,000 feet per hour. (Write: *Railway Maintenance Corp., Dept. RTS, Box 1888, Pittsburgh 30, Pa.)*

13. BOLTS. 20-page pocket-size booklet (HS-1) "How to Work With High Strength Bolts" provides working information on high strength bolts for construction crews; includes tables, on-the-job photos, ordering instructions. (Write: *Russell, Burdsall & Ward Bolt & Nut Co., Dept. RTS, Port Chester, N.Y.)*

14. SOLENOID PILOTS. 4-page bulletin (1010) "Spence Solenoid Pilots for Lower Cost On-Off Control" describes, illustrates, gives schematic diagrams of typical applications of several types of solenoid pilots. (Write: *Spence Engineering Co., Dept. RTS, Walden, N.Y.)*

15. TIMBER CONNECTOR. Pocket-size 2-color folder "Tapered Tightness" on Teco wedge-fit split-ring timber connector for wood structures. (Write: *Timber Engineering Co., Dept. RTS. 1319 —18th St. NW, Washington 6, D.C.)*

16. BATTERY WATER. 8-page folder (B56 series) gives general description on use and operation of Hydrion battery-water units for direct conversion of ordinary tap-water to pure battery water without heat or power; includes specifications. (Write: *A. E. Tomkin & Co., Dept. RTS, 1507 M Street NW, Washington 5, D.C.)*

17. FLOODLIGHTING POLES. 16-page catalog (#87) "Union Metal Floodlighting & Area Lighting Poles" contains detailed information on tapered steel and aluminum Monotube floodlighting poles for lighting outdoor activities, commercial and industrial areas of all types. (Write: *Union Metal Mfg. Co., Dept. RTS, Canton 5, Ohio)*

18. FLOOR COATING. 4-page 3-color folder on Flourish waxless floor-coating, a slip-resistant item; describes and points out advantages. (Write: *U. S. Sanitary Specialties Corp., Dept. RTS, 1001 S. California Ave., Chicago 12, Illinois)*

19. FORGED STEEL FITTINGS. 12-page pocket-size catalog contains basic information on all the Division's products including forged steel screw-end and socket-welding fittings. (Write: *W-S Fittings Div., H. K. Porter Co., Dept. RTS, P.O. Box 95, Roselle, N.J.)*

20. ENGINEERING REVIEW. 36-page Annual Engineering Review (Jan. 1956) issue of "Westinghouse Engineer" presents in word and picture 1955 engineering highlights; includes photos and data on all industries. (Write: *Westinghouse Electric Corp., Dept. RTS, P.O. Box 2278, 3 Gateway Center, Pittsburgh 30)*

21. PORTABLE COMPRESSOR. 4-page colorful brochure 1210-B2 describes, illustrates, points out features of "New Worthington Blue Brute Rotary" portable rotary rubber-wheeled compressor; includes color cut-away drawings. (Write: *Worthington Corp., Dept. RTS, Harrison, N.J.)*

Illinois Central Photo

Track may be laid smooth as a city street, but heavy freights and fast passenger trains hammer and strain it without letup.

The surest way to reduce maintenance costs is to use powerful shock absorbers —those great railway spring washers that give enough reserve power to maintain bolt tensions and protect your joints and rail ends.

IMPROVED HIPOWERS IMPROVE TRACK

THE NATIONAL LOCK WASHER COMPANY, NEWARK 5, N. J., U. S. A.

A COMPLETE LINE OF RAILWAY SPRING WASHERS

On the Northern Pacific

CAT* OFF-TRACK EQUIPMENT MOVES 350,000 YARDS TO ELIMINATE HOMESTAKE TUNNEL

Near Homestake, Mont., the Northern Pacific made a 3447-foot line change to eliminate the 67-year-old, 680-foot Homestake tunnel. Contractor was Albert Lalonde Company, Sidney, Mont.

The big diversion job was turned over to a team of Caterpillar off-track equipment—D8s, DW21s with Athey Rear Dump PR21s, and a No. 12 Motor Grader. They moved 350,000 yards of decomposed and tombstone granite, made a cut 80 feet deep in places.

Each of the brawny DW21-PR21s moved an average of 80 yards an hour over a 2000-foot haul distance with 7 per cent down grade. The units' 90-degree turning angle helped speed the job, because much of the loading was done in close quarters. The turning angle also made possible fast maneuverability in getting into dumping position. These rigs can dump a heaping load of 22.5 cubic yards cleanly in 18 seconds!

To handle large boulders mixed in the granite, dependable Caterpillar D8 Tractors were used. Equipped with Gardner-Denver compressors and drills, they drilled 12-foot holes for shooting rock. Other D8s, equipped with No. 8U Bulldozers, leveled at the fill and carved out haul roads.

For new, high levels of efficiency, standardize on versatile, hard-working Caterpillar equipment for your off-track construction. Your nearby Caterpillar Dealer stocks all parts, so you avoid tying up your capital in inventory. See him soon. He'll demonstrate how Caterpillar off-track equipment will handle any job with a minimum of investment.

Caterpillar Tractor Co., Peoria, Illinois, U. S. A.

CATERPILLAR*

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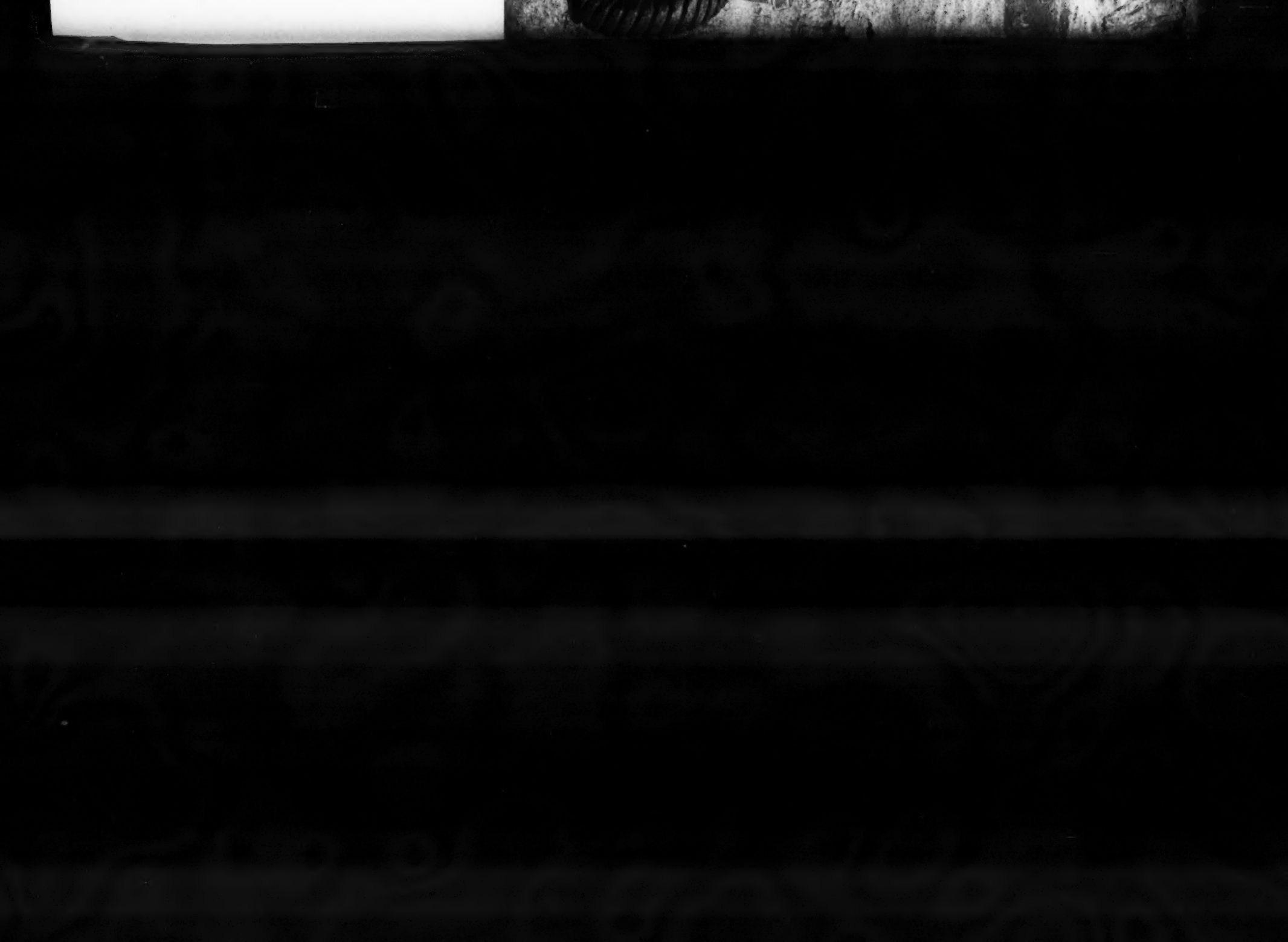
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